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ATLANTIC PRIMARY ARITHMETIC.

SIMPLE NUMBERS.

BY

G. L. DEMAREST.

BOSTON:

GINN BROTHERS AND COMPANY,

12 BRADSTREET.

1870.

35284

Gift Lemuel F. Woodward,
June 14, 1911.

ATLANTIC PRIMARY ARITHMETIC.

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G. L. DEMAREST,

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TO TEACHERS.

The PRIMARY NUMBER-LESSONS, pp. 1 to 27, are intended for the smallest children in the Primary School. It will be seen that they are not mere exercises in counting; and they aim to give the idea of the elementary numbers not only in general, but in detail. The book, so far, is exclusively for the teacher.

For the exercises farther on, commencing with page 28, in graded schools let no preparation by the scholar be attempted beforehand. Let the work be freshly done in the class-room. How closely the drill shall be followed must depend upon the judgment of the teacher. The exercises are afterward to be reproduced by the scholar, for which purpose the book will be needed, as well as for the exercises applying the principles concretely. In the latter cases, the reproduction is to be simply by the figures and signs, as in Exercise 34: $3 + 6 = 9$; $2 + 5 = 7$; $7 + 2 = 9$; $4 + 4 = 8$; $2 + 6 = 8$ &c. In ungraded schools, however, for want of time, previous preparation is a necessity, that the usual class-hour may be devoted to drill.

Please read the Notes on pages 1 and 28, 29, with special attention.

This little book is prepared, not in the interest of those whose number-perceptions are quick, but in that of those who, under the usual regimen of our lower schools, do not readily learn to compute with facility. The compiler has sought to conform his method to the nature of child-mind; and he will be thankful for those conscientious efforts of the teacher, which shall tend to make his work successful. Let nothing be passed until it is thoroughly mastered; and when that is accomplished, make no delay merely for the purpose of adhering to the letter.

G. L. D.



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PRIMARY NUMBER-LESSONS.

NOTE. — It is intended that these Lessons shall be used in the youngest classes of the Primary School, exercises in Number commencing with the earliest school instruction. The child is not to use the book, until he enters upon the second part, page 28. This part is for the use of Teachers only.

In such lessons as these, we can only suggest order and method. They suppose the teacher to address very young pupils; but though they prescribe words, they only commend these in substance, and not in precise form. The teacher will avail herself of the circumstances to draw out correct answers, and will never supply these herself, unless her appeal to the whole class fails. If one scholar answers incorrectly, let others, if they can, make the correction, rather than the teacher, and then let the corrected scholar repeat the proper statement. Expect in the very simplest things a great lack of readiness, and “let patience” — and kindness — “have their perfect work.”

APPARATUS. — Blackboard, crayons, slates and pencils, beans, grains of corn, nuts, pins, numeral frame, pebbles, half-inch cubes or wooden blocks.

I.

To develop the idea of ONE, distinguishing it from several.

To test whether this lesson is needful, try several of the directions implied in ¶ 6. If any hesitancy or doubt is manifest, apply the whole lesson.

§ 1.

1. What are these? [Pebbles — nuts — grains of corn — beans — pins — hands — fingers — crayons — pencils — balls or marbles (on the numeral frame) — dots (on the blackboard) — marks (do.) — lines (do., right and curved) — cubes (or blocks or pieces) of wood.]

2. Bring me some pebbles — some nuts — some grains of corn — some beans — some pins — some crayons — some pencils — some cubes (or blocks or pieces) of wood. Show me your hands — your fingers. Make (on slate or blackboard) some dots — some marks — some right or straight lines — some curved lines.

3. What is this? [A pebble — a nut — a grain of corn — a bean — a pin — a crayon — a pencil — a cube (or piece or block) of wood — a slate — a desk — a bell — a hand — a finger — a dot — a mark — a right line — a curved line.]

§ 2.

4. Make (on slate or blackboard) a dot — a mark — a right line — a curved line. Show me a hand — a finger — a desk — a window — a boy — a girl. Bring me a pebble — a nut — a grain of corn — a bean — a pin — a crayon — a pencil — a cube of wood — a slate — a book.

5. We say, sometimes, instead of *a* thing, *one* thing: *a* pebble is *one* pebble; *a* nut is *one* nut; *a* slate is *one* slate; *a* finger is *one* finger; *a* dot is *one* dot, &c.

6. Make one dot — one mark — one right line — one curved line. Show me one hand — one finger — one desk — one window — one boy — one girl. Bring me one pebble — one nut — one grain of corn — one bean — one pin — one crayon — one pencil — one cube of wood — one slate — one book.

Continue the lesson until each pupil evidently has clearly in his mind the idea of *One*.

NOTE. — The teacher will dwell on the following lessons as may be needful. It will be seen that they are not mere exercises of counting; but of the usual arithmetical processes.

To avoid repetition of matter, and save room, our questions, as will be seen, are much condensed. They are to be filled out, according to circumstances. Continue each lesson on successive days until the children have mastered the idea to be developed by it.

II.

To develop the idea of Two.

§ 1.

1. Bring me one pebble: bring me one pebble more. Here are two pebbles: one pebble and one pebble are two pebbles. You may count them. Bring me one nut: bring me one nut more. Here are two nuts; one nut and one nut are two nuts. Count them. Bring me one bean: bring me one bean more. How many beans have I? One bean and one bean are how many beans? (Two *beans*.) [Grains of corn — pins — crayons — pencils — cubes (or blocks or pieces) of wood — hands — fingers — dots — marks — right lines — curved lines.]

2. One boy and one boy are how many boys? One girl and one girl are how many girls? One slate and one slate are how many slates? One window and one window are how many windows? One desk and one desk are how many desks? One and one are how many?

3. How many and what are these? [Two beans — two nuts — two grains of corn — two pebbles — two pins — two crayons — two pencils — two cubes of wood — two slates — two books — two hands — two fingers — two dots — two marks — two right lines — two curved lines.]

§ 2.

4. Bring me some pebbles: choose out two of them. [Some beans — some nuts — some grains of corn — some pebbles — some pins — some crayons — some pencils — some cubes of wood.]

5. Bring me two pebbles — two beans — two nuts — two grains of corn — two pins — two crayons — two pencils — two cubes of wood. Make two dots — two marks — two right lines — two curved lines. Show me two hands — two fingers.

6. How many hands have you? How many heads? Noses? Chins? Ears? Eyes? Feet? Necks?

III.

To develop the idea of THREE.

§ 1.

1. Bring me two pebbles: bring me one pebble more. Here are three pebbles; two pebbles and one pebble are three pebbles. Count them. Bring me two nuts: bring me one nut more. Here are three nuts; two nuts and one nut are three nuts. Count them. Bring me two beans: bring me one bean more. How many beans have I? Two beans and one bean are how many beans? [Proceed after the same manner with other things.]

2. Bring me one pebble: bring me two pebbles more. How many pebbles have I? One pebble and two pebbles are how many pebbles? [Deal with other things after the same manner.]

3. Bring me one pebble, three times. How many pebbles have I? One pebble and one pebble and one pebble are how many pebbles? Three times one pebble are how many pebbles? &c., &c.*

§ 2.

4. Two apples and one apple are how many apples? [Let the answers to such questions be concrete: three apples.] Two pears and one pear are how many pears? &c., &c.* [Finally,] Two and one are how many?

5. One apple and two apples are how many apples? &c., &c.* [Finally,] One and two are how many?

6. One apple and one apple and one apple are how many apples? &c., &c.* [Finally,] One and one and one are how

* Where the &c. appears, it is the indication that the teacher is to proceed with similar questioning with other things as in Lessons I. and II.

many? One taken three times is how many? Three times one are how many? One taken two times is how many? Two times one are how many?

§ 3.

7. Bring me three pebbles — three beans, &c., &c. Make three dots — three right lines, &c. Raise the right hand three times, &c.

8. Here are three pebbles: I take one away, how many remain? [Deal with other things after the same manner. Finally,] Take one from three, how many remain? One from three leaves how many?

9. Bring me three pebbles: take one away; how many remain? [Deal with other things in the same manner. Finally,] Take two from three, how many remain? Two from three leaves how many?

IV.

To develop the idea of FOUR.

§ 1.

1. Bring me three pebbles: bring me one pebble more. Here are four pebbles: three pebbles and one pebble are four pebbles. Count them. Bring me three beans: bring me one bean more. Here are four beans; three beans and one bean are four beans. Count them. Bring me three nuts: bring me one nut more. How many nuts have I? Three nuts and one nut are how many nuts? &c., &c. [Finally,] Three and one are how many?

2. Bring me one pebble: bring me three pebbles more. How many pebbles have I? One pebble and three pebbles are how many pebbles? &c., &c. [Finally,] One and three are how many?

3. Bring me two pebbles: bring me two pebbles more. How many pebbles have I? Two pebbles and two pebbles .

are how many pebbles? &c., &c. [Finally,] Two and two are how many?

§ 2.

4. One apple and three apples are how many? One apple and one apple? One apple and two apples? Three apples and one apple? Two apples and one apple? Two apples and two apples? [Pears — cherries — peaches — plums, &c.]

5. One and three are how many? One and one? Three and one? One and two? Two and one? Two and two?

6. Bring me one pebble, four times: how many pebbles have I? Four times one pebble are how many pebbles? Two times one pebble are how many pebbles? Bring me two pebbles, two times: how many pebbles have I? Two times two pebbles are how many pebbles? Three times one pebble are how many pebbles? &c., &c. [Finally,] Four times one are how many? Two times one? Two times two? Three times one?

§ 3.

7. Bring me four pebbles — four beans, &c., &c. Make four dots — four right lines, &c. Show me four fingers, &c.

8. Bring me four pebbles: take one away, how many remain? [Four beans — four nuts, &c. Finally,] Take one from four, how many remain? One from four leaves how many?

9. Bring me four pebbles: take three away — how many remain? &c., &c. [Finally,] Take three from four, how many remain? Three from four leaves how many?

10. Bring me four pebbles: take two away — how many remain? &c., &c. [Finally,] Take two from four, how many remain? Two from four leaves how many?

V.

To develop the idea of FIVE.

§ 1.

1. Bring me four pebbles: bring me one pebble more. Here are five pebbles: four pebbles and one pebble are five pebbles. Count them. Bring me four beans: bring me one bean more. Here are five beans: four beans and one bean are five beans. Count them. Bring me four nuts: bring me one nut more. How many nuts have I? Four nuts and one nut are how many nuts? &c., &c. [Finally,] Four and one are how many?

2. Bring me one pebble: bring me four pebbles more. How many pebbles have I? One pebble and four pebbles are how many pebbles? &c., &c. [Finally,] One and four are how many?

3. Bring me two pebbles: bring me three pebbles more. How many pebbles have I? Two pebbles and three pebbles are how many pebbles? &c., &c. [Finally,] Two and three are how many?

4. Bring me three pebbles: bring me two pebbles more. How many pebbles have I? Three pebbles and two pebbles are how many pebbles? &c., &c. [Finally,] Three and two are how many?

§ 2.

5. One book and one book are how many? Two books and two books? One book and two books? Three books and two books? One book and three books? Two books and three books? One book and four books? Two books and one book? Four books and one book? Three books and one book? [Slates — desks — boys — girls, &c.]

6. One and four are how many? One and one? Two and three? One and two? Three and one? Two and two? One and three? Three and two? Two and one?

7. Bring me one pebble, five times: how many pebbles have I? Five times one pebble are how many pebbles? Two times one pebble are how many pebbles? Two times two pebbles? Three times one pebble? Four times one pebble? &c., &c. [Finally,] Five times one are how many? Two times one? Two times two? Four times one? Three times one?

8. Bring me five pebbles — five beans, &c., &c. Make five dots — five right lines, &c. Show me five fingers, &c.

§ 3.

9. Bring me five pebbles: take one away — how many remain? [Beans — nuts, &c. Finally,] Take one from five, how many remain? One from five leaves how many?

10. Bring me five pebbles: take four away — how many remain? [Beans — nuts, &c. Finally,] Take four from five, how many remain? Four from five leaves how many?

11. Bring me five pebbles: take three away — how many remain? &c., &c. [Finally,] Take three from five, how many remain? Three from five leaves how many?

12. Bring me five pebbles: take two away — how many remain? &c., &c. [Finally,] Take two from five, how many remain? Two from five leaves how many?

VI.

To develop the idea of Six.

§ 1.

1. Bring me five pebbles: bring me one pebble more. Here are six pebbles: five pebbles and one pebble are six pebbles. Count them. Bring me five beans: bring me one bean more. Here are six beans: five beans and one bean are six beans. Count them. Bring me five nuts: bring me one nut more. How many nuts have I? Five nuts and one nut are how many nuts? &c., &c. [Finally,] Five and one are how many?

2. Bring me one pebble: bring me five pebbles more. How many pebbles have I? One pebble and five pebbles are how many pebbles? &c., &c. [Finally,] One and five are how many?

3. Bring me two pebbles: bring me four pebbles more. How many pebbles have I? Two pebbles and four pebbles are how many pebbles? &c., &c. [Finally,] Two and four are how many?

4. Bring me three pebbles: bring me three pebbles more. How many pebbles have I? Three pebbles and three pebbles are how many pebbles? &c., &c. [Finally,] Three and three are how many?

§ 2.

5. Bring me four pebbles: bring me two pebbles more. How many pebbles have I? Four pebbles and two pebbles are how many pebbles? &c., &c. [Finally,] Four and two are how many?

6. One orange and one orange are how many? Two oranges and two oranges? Three oranges and three oranges? One orange and two oranges? Two oranges and three oranges? Three oranges and one orange? Two oranges and four oranges? Two oranges and one orange? Three oranges and two oranges? One orange and three oranges? One orange and five oranges? Four oranges and two oranges? One orange and four oranges? Five oranges and one orange? Four oranges and one orange? [Lemons — cakes — candies — hoops, &c., &c.]

7. One and one are how many? Two and two? Three and three? One and two? Two and three? Three and one? Two and four? Two and one? Three and two? One and three? One and five? Four and two? One and four? Five and one? Four and one?

8. Bring me one pebble six times: how many pebbles have I? Six times one pebble are how many pebbles? Bring

me two pebbles three times: how many pebbles have I? Three times two pebbles are how many pebbles? Bring me three pebbles two times: how many pebbles have I? Two times three pebbles are how many pebbles? &c., &c. [Finally,] Six times one are how many? Three times two? Two times three? Five times one? Four times one? Two times two? Three times one? Two times one?

§ 3.

9. Bring me six nuts: divide or separate them into two equal portions. How many nuts are there in each portion? Three nuts are contained in six nuts, how many times? Two times three nuts are how many nuts? &c., &c. [Finally,] Three is contained in six how many times?

10. Bring me six nuts: divide or separate them into three equal portions. How many nuts are there in each portion? Two nuts are contained in six nuts, how many times? Three times two nuts are how many nuts? &c., &c. [Finally,] Two is contained in six how many times?

11. Bring me six nuts: divide or separate them into six equal portions. How many nuts are there in each portion? One nut is contained in six nuts how many times? Six times one nut are how many nuts? &c., &c. [Finally,] One is contained in six how many times?

12. Bring me four nuts: divide or separate them into two equal portions. How many nuts are there in each portion? Two nuts are contained in four nuts how many times? Two times two nuts are how many nuts? &c., &c. [Finally,] Two is contained in four how many times?

§ 4.

13. Bring me six nuts—six beans, &c., &c. Make six dots—six right lines, &c. Show me six fingers, &c.

14. Bring me six beans: take one away—how many remain? &c., &c. [Finally,] Take one from six, how many remain? One from six leaves how many?

15. Bring me six beans: take two away — how many remain? &c., &c. [Finally,] Take two from six, how many remain? Two from six leaves how many?

16. Bring me six beans: take three away — how many remain? &c., &c. [Finally,] Take three from six, how many remain? Three from six leaves how many?

17. Bring me six beans: take four away — how many remain? &c., &c. [Finally,] Take four from six, how many remain? Four from six leaves how many?

18. Bring me six beans: take five away — how many remain? &c., &c. [Finally,] Take five from six, how many remain? Five from six leaves how many?

19. One from six leaves how many? One from five? One from four? One from three? One from two? Two from six? Two from four? Two from five? Two from three? Three from six? Three from five? Three from four? Four from six? Four from five? Five from six?

VII.

To develop the idea of SEVEN.

§ 1.

1. Bring me six beans: bring me one bean more. Here are seven beans: six beans and one bean are seven beans. Count them. Bring me six nuts: bring me one nut more. Here are seven nuts: six nuts and one nut are seven nuts. Count them. Bring me six pebbles: bring me one pebble more. How many pebbles have I? Six pebbles and one pebble are how many pebbles? &c., &c. [Finally,] Six and one are how many?

2. Bring me one bean: bring me six beans more. How many beans have I? One bean and six beans are how many beans? &c., &c. [Finally,] One and six are how many?

3. Bring me two beans: bring me five beans more. How

many beans have I? Two beans and five beans are how many beans? &c., &c. [Finally,] Two and five are how many?

4. Bring me three beans: bring me four beans more. How many beans have I? Three beans and four beans are how many beans? &c., &c. [Finally,] Three and four are how many?

§ 2.

5. Bring me four beans: bring me three beans more. How many beans have I? Four beans and three beans are how many beans? &c., &c. [Finally,] Four and three are how many?

6. Bring me five beans: bring me two beans more. How many beans have I? Five beans and two beans are how many beans? &c., &c. [Finally,] Five and two are how many?

7. One boy and one boy are how many boys? Two boys and two boys? One boy and two boys? Three boys and three boys? One boy and three boys? Two boys and one boy? One boy and four boys? Three boys and one boy? One boy and five boys? Two boys and three boys? One boy and six boys? Three boys and two boys? Two boys and four boys? Four boys and one boy? Two boys and five boys? Five boys and one boy? Three boys and four boys? Four boys and two boys? Six boys and one boy? Five boys and two boys? Four boys and three boys? [Girls — men — women — birds — lambs, &c., &c.]

8. One and one are how many? Two and two? Three and three? One and two? Two and three? Three and four? One and three? Two and four? One and four? Two and five? Four and one? One and five? Two and one? One and six? Three and one? Four and two? Five and one? Three and two? Four and three? Six and one? Five and two?

§ 3.

9. Bring me seven beans—seven nuts—seven pebbles, &c. Make seven dots—seven marks, &c., &c. Show me seven fingers, &c., &c.

10. Bring me one bean seven times: how many beans have I? Seven times one bean are how many beans?—[Repeat ¶ 8, Lesson VI., adding at the end, “Seven times one?”]

11. Bring me seven beans: divide or separate them into seven equal portions. How many beans are there in each portion? One bean is contained in seven beans, how many times? Seven times one bean are how many beans? &c., &c. [Finally,] One is contained in seven, how many times?

12. [Repeat ¶ 9, Lesson VI.]

§ 4.

13. [Repeat ¶ 10, Lesson VI.]

14. [Repeat ¶ 11, Lesson VI.]

15. [Repeat ¶ 12, Lesson VI.]

16. How many times is one contained in seven? One in three? One in five? One in two? One in four? One in six? Two in six? Two in four? Three in six?

17. Bring me seven beans: take one away, how many remain? &c., &c. [Finally,] Take one from seven, how many remain? One from seven leaves how many?

§ 5.

18. Bring me seven beans: take two away, how many remain? &c., &c. [Finally,] Take two from seven, how many remain? Two from seven leaves how many?

19. Bring me seven beans: take three away, how many remain? &c., &c. [Finally,] Take three from seven, how many remain? Three from seven leaves how many?

20. Bring me seven beans: take four away, how many remain? &c., &c. [Finally,] Take four from seven, how many remain? Four from seven leaves how many?

21. Bring me seven beans: take five away, how many remain? &c., &c. [Finally,] Take five from seven, how many remain? Five from seven leaves how many?

22. Bring me seven beans: take six away, how many remain? &c., &c. [Finally,] Take six from seven, how many remain? Six from seven leaves how many?

23. One from seven leaves how many? One from six? One from five? One from four? One from three? One from two? Two from seven? Two from five? Two from three? Two from six? Two from four? Three from seven? Three from four? Three from six? Three from five? Four from seven? Four from six? Four from five? Five from seven? Five from six? Six from seven?

VIII.

To develop the idea of EIGHT.

§ 1.

1. Bring me seven nuts: bring me one nut more. Here are eight nuts: seven nuts and one nut are eight nuts. Count them. Bring me seven beans: bring me one bean more. Here are eight beans: seven beans and one bean are eight beans. Count them. Bring me seven pebbles: bring me one pebble more. How many pebbles have I? Seven pebbles and one pebble are how many pebbles? &c., &c. [Finally,] Seven and one are how many?

2. Bring me one nut: bring me seven nuts more. How many nuts have I? One nut and seven nuts are how many nuts? &c., &c. [Finally,] One and seven are how many?

3. Bring me two nuts: bring me six nuts more. How many nuts have I? Two nuts and six nuts are how many nuts? &c., &c. [Finally,] Two and six are how many?

4. Bring me three nuts: bring me five nuts more. How many nuts have I? Three nuts and five nuts are how

many nuts? &c., &c. [Finally,] Three and five are how many?

5. Bring me four nuts: bring me four nuts more. How many nuts have I? Four nuts and four nuts are how many nuts? &c., &c. [Finally,] Four and four are how many?

§ 2.

6. Bring me five nuts: bring me three nuts more. How many nuts have I? Five nuts and three nuts are how many nuts? &c., &c. [Finally,] Five and three are how many?

7. Bring me six nuts: bring me two nuts more. How many nuts have I? Six nuts and two nuts are how many nuts? &c., &c. [Finally,] Six and two are how many?

8. One marble and one marble are how many marbles? One marble and three marbles? One marble and five marbles? Two marbles and two marbles? Three marbles and three marbles? One marble and two marbles? Four marbles and four marbles? One marble and four marbles? Five marbles and two marbles? One marble and six marbles? Two marbles and one marble? Three marbles and two marbles? One marble and seven marbles? Two marbles and three marbles? Three marbles and one marble? Two marbles and four marbles? Seven marbles and one marble? Two marbles and five marbles? Four marbles and one marble? Five marbles and three marbles? Two marbles and six marbles? Three marbles and four marbles? Four marbles and two marbles? Six marbles and two marbles? Three marbles and five marbles? Four marbles and three marbles? Five marbles and one marble? Six marbles and one marble? [Cents — dolls — flowers — books, &c.]

9. One and one are how many? One and three? One and five? Two and two? Three and three? One and two? Four and four? One and four? Five and two? One and six? Two and one? Three and two? One and seven? Two and three? Three and one? Two and four? Seven

and one? Two and five? Four and one? Five and three? Two and six? Three and four? Four and two? Six and two? Three and five? Four and three? Five and one? Six and one?

§ 3.

10. Bring me eight nuts — eight beans — eight grains of corn, &c. Show me eight fingers, &c. Make eight dots, eight marks, eight right lines, &c.

11. Bring me eight nuts: take one away, how many remain? &c., &c. [Finally,] Take one from eight, how many remain? One from eight leaves how many?

12. Bring me eight nuts: take two away, how many remain? &c., &c. [Finally,] Take two from eight, how many remain? Two from eight leaves how many?

13. Bring me eight nuts: take three away, how many remain? &c., &c. [Finally,] Take three from eight, how many remain? &c. Three from eight leaves how many?

14. Bring me eight nuts: take four away, how many remain? &c., &c. [Finally,] Take four from eight, how many remain? Four from eight leaves how many?

§ 4.

15. Bring me eight nuts: take five away, how many remain? &c., &c. [Finally,] Take five from eight, how many remain? Five from eight leaves how many?

16. Bring me eight nuts: take six away, how many remain? &c., &c. [Finally,] Take six from eight, how many remain? Six from eight leaves how many?

17. Bring me eight nuts: take seven away, how many remain? &c., &c. [Finally,] Take seven from eight, how many remain? Seven from eight leaves how many?

18. One from eight leaves how many? One from seven? One from six? One from five? One from four? One from three? One from two? Two from eight? Two from six? Two from four? Two from seven? Two from five? Two

from three? Three from eight? Three from five? Three from seven? Three from four? Three from six? Four from eight? Four from six? Four from seven? Four from five? Five from eight? Five from six? Five from seven? Six from eight? Six from seven? Seven from eight?

§ 5.

19. Bring me one nut eight times: how many nuts have I? Eight times one nut are how many nuts? &c., &c. [Finally,] Eight times one are how many?

20. Bring me two nuts four times: how many nuts have I? Four times two nuts are how many nuts? &c., &c. [Finally,] Four times two are how many?

21. Bring me four nuts two times: how many nuts have I? Two times four nuts are how many nuts? &c., &c. [Finally,] Two times four are how many?

22. Eight times one are how many? Seven times one? Four times two? Six times one? Two times four? Five times one? Three times two? Two times two? Four times one? Two times three? Three times one? Two times one?

§ 6.

23. Bring me eight nuts: divide or separate them into two equal portions. How many nuts are there in each portion? Four nuts are contained in eight nuts, how many times? Two times four nuts are how many nuts? &c., &c. [Finally,] Four is contained in eight how many times?

24. Bring me eight nuts: divide or separate them into four equal portions. How many nuts are there in each portion? Two nuts are contained in eight nuts how many times? Four times two nuts are how many nuts? &c., &c. [Finally,] Two is contained in eight how many times?

25. Bring me eight nuts: divide or separate them into eight equal portions. How many nuts are there in each por-

tion? One nut is contained in eight nuts how many times? Eight times one nut are how many nuts? &c., &c. [Finally,] One is contained in eight how many times?

26. Four is contained in eight how many times? Two in eight? One in eight? One in seven? Three in six? Two in six? One in six? One in five? Two in four? One in four? One in three? One in two?

IX.

To develop the idea of NINE.

§ 1.

1. Make eight dots [on the blackboard], make one dot more [separated by some space]. Here are nine dots: eight dots and one dot are nine dots. Count them. Make eight marks: make one mark more. Here are nine marks: eight marks and one mark are nine marks. Count them. Make eight lines: make one line more. How many lines are here? Eight lines and one line are how many lines? &c., &c. [Finally,] Eight and one are how many?

2. Make one dot: make eight dots more. How many dots are here? One dot and eight dots are how many dots? &c., &c. [Finally,] One and eight are how many?

3. Make two dots: make seven dots more. How many dots are here? Two dots and seven dots are how many dots? &c., &c. [Finally,] Two and seven are how many?

4. Make three dots: make six dots more. How many dots are here? Three dots and six dots are how many dots? &c., &c. [Finally,] Three and six are how many?

§ 2.

5. Make four dots: make five dots more. How many dots are here? Four dots and five dots are how many dots? &c., &c. [Finally,] Four and five are how many?

6. Make five dots: make four dots more. How many dots

are here? Five dots and four dots are how many dots? &c., &c. [Finally,] Five and four are how many?

7. Make six dots: make three dots more. How many dots are here? Six dots and three dots are how many dots? &c., &c. [Finally,] Six and three are how many?

8. Make seven dots: make two dots more. How many dots are here? Seven dots and two dots are how many dots? &c., &c. [Finally,] Seven and two are how many?

§ 3.

9. One book and one book are how many books? One book and three books? One book and five books? One book and seven books? One book and two books? One book and four books? One book and six books? One book and eight books? [Slates — pencils — desks — windows, &c.]

10. Two books and one book are how many books? Two books and three books? Two books and five books? Two books and seven books? Two books and two books? Two books and four books? Two books and six books? [Slates — pencils — desks — windows, &c.]

11. Three books and one book are how many books? Three books and four books? Three books and two books? Three books and five books? Three books and three books? Three books and six books? Four books and one book? Four books and five books? Four books and two books? Four books and four books? Four books and three books? &c.

12. Five books and one book are how many books? Five books and three books? Five books and two books? Five books and four books? Six books and one book? Six books and three books? Six books and two books? Seven books and one book? Seven books and two books? Eight books and one book? &c.

13. One and one are how many? Two and one? Three

and one? Four and one? Five and one? Six and one? Seven and one? Eight and one? One and two? Three and two? Five and two? Seven and two? Two and two? Four and two? Six and two? One and three? Four and three? Two and three? Five and three? Three and three? Six and three?

14. One and four are how many? Five and four? Two and four? Four and four? Three and four? One and five? Three and five? Two and five? Four and five? One and six? Three and six? Two and six? One and seven? Two and seven? One and eight?

§ 4.

15. Bring me nine nuts—nine pebbles—nine beans, &c. Show me nine fingers, &c. Make nine dots—nine marks—nine right lines, &c.

16. Make nine dots: take one away, how many remain? &c., &c. [Finally,] Take one from nine how many remain? One from nine leaves how many?

17. Make nine dots: take two away, how many remain? &c., &c. [Finally,] Take two from nine, how many remain? Two from nine leaves how many?

18. Make nine dots: take three away, how many remain? &c., &c. [Finally,] Take three from nine, how many remain? Three from nine leaves how many?

19. Make nine dots: take four away, how many remain? &c., &c. [Finally,] Take four from nine, how many remain? Four from nine leaves how many?

20. Make nine dots: take five away, how many remain? &c., &c. [Finally,] Take five from nine, how many remain? Five from nine leaves how many?

§ 5.

21. Make nine dots: take six away, how many remain? &c., &c. [Finally,] Take six from nine, how many remain? Six from nine leaves how many?

22. Make nine dots: take seven away, how many remain? &c., &c. [Finally,] Take seven from nine, how many remain? Seven from nine leaves how many?

23. Make nine dots: take eight away, how many remain? &c., &c. [Finally,] Take eight from nine, how many remain? Eight from nine leaves how many?

24. One from nine leaves how many? One from eight? One from seven? One from six? One from five? One from four? One from three? One from two? Two from nine? Two from seven? Two from five? Two from three? Two from eight? Two from six? Two from four? Three from nine? Three from six? Three from eight? Three from five?

25. Three from seven are how many? Three from four? Four from nine? Four from five? Four from eight? Four from six? Four from seven? Five from nine? Five from seven? Five from eight? Five from six? Six from nine? Six from seven? Six from eight? Seven from nine? Seven from eight? Eight from nine?

§ 6.

26. Make one dot nine times: how many dots have you made in all? Nine times one dot are how many dots? &c., &c. [Finally,] Nine times one are how many?

27. Make three dots three times: how many dots have you made in all? Three times three dots are how many dots? &c., &c. [Finally,] Three times three are how many?

28. Nine times one are how many? Seven times one? Five times one? Three times one? Eight times one? Six times one? Four times one? Two times one? Two times two? Three times two? Four times two? Two times three? Three times three? Two times four?

29. Make nine dots: divide or separate them into three equal portions. How many dots are there in each portion?

Three dots are contained in nine dots, how many times? Three times three dots are how many dots? &c., &c. [Finally,] Three is contained in nine how many times?

30. Make nine dots: divide or separate them into nine equal portions. How many dots are there in each portion? One dot is contained in nine dots, how many times? Nine times one dot are how many dots? &c., &c. [Finally,] One is contained in nine how many times?

31. Three is contained in nine how many times? One in nine? Four in eight? Two in eight? One in eight? One in seven? Three in six? Two in six? One in six? One in five? Two in four? One in four? One in three? One in two?

X.

*Figures.**

§ 1.

1. Make one mark, thus, *l*. We use this as a figure, to signify *one*. If we use the figure, we may write,

for one bean,	1 bean;
for one nut,	1 nut, &c.

Write with the figure, 1 pin, 1 apple, 1 boy, 1 girl, &c. Show me and read what you have written.

2. Write the figure 1 alone. What does it signify or mean? Write the following, using the figure for one: 1 and 1 are two; 1 and 1 and 1 are three; 1 and 1 and 1 and 1 are four, &c.

3. Instead of this figure, we sometimes use a letter, to number parts of a book. It is the capital letter, *I*, which is the nearest in form to our mark. You may print that letter.

* In every case, see that the figures are neatly made. Where words are required to be written, and the scholar cannot write, let him print. But children who reach this stage ought to write legibly, if not handsomely.

10. Write the figure 3 alone. What does it signify? Write the following, using the figures as far as they have been given to you: 1 and 1 and 1 are three; 1 and 2 are 3; 2 and 2 are four; 3 and 2 are five; 3 and 3 are six; &c.

11. We use 3 capital I's, in numbering the parts of a book, to represent three, thus, III. Print the letters representing one; the letters representing two; those representing three. What do they mean when used for numbers? Find the lesson in this book numbered III.

12. Make one mark; on the same line, write the word one; print the letter meaning one; write the figure one. Underneath, make two marks; write the word two; print the letters meaning two; write the figure two. On another line, follow the same course with three.

/	One	I	1
//	Two	II	2
///	Three	III	3

§ 4.

13. Make four marks. For this number we use the figure, 4. Write with the figure, 4 beans, 4 nuts, 4 pins, &c. Write 3 beans, &c. Write 2 beans, &c. Write 1 bean, &c. Show me and read what you have written.

14. Write the figure 4 alone. What does it signify? Write the following, using the figures: 1 and 1 are 2; 1 and 2 are 3; 2 and 1 are 3; 2 and 2 are 4; 1 and 3 are 4; 3 and 1 are 4.

15. We represent the number four, in letters, thus, IV. — a capital I and V. Print the letter representing one: the letters representing two: those representing three: those representing four. What do they mean when used for numbers? Find the lesson in this book numbered IV.

16. Make the table required in ¶ 12, and continue one line further.

§ 5.

17. Make five marks. For this number we use the figure, 5. Write with the figure, 5 beans, 5 nuts, &c. Write 4 beans, &c.; 3 beans, &c.; 2 beans, &c.; 1 bean, &c. Show me and read what you have written.

18. Write the figure 5 alone. What does it mean? Write the following, using the figures: 1 and 1 are 2; 1 and 2 are 3; 1 and 3 are 4; 1 and 4 are 5; 2 and 1 are 3; 2 and 2 are 4; 2 and 3 are 5; 3 and 1 are 4; 3 and 2 are 5; 4 and 1 are 5.

19. We represent the number five, in letters, by a capital V. Print the letter representing one; those representing two; those representing three; those representing four; that representing five. What do they mean when used for numbers? Find the lesson in this book numbered V.

20. Make the table required in ¶ 16, and continue one line further.

§ 6.

21. Make six marks. For this number we use the figure, 6. Write with the figure, 6 beans, &c.; 5 beans, &c.; 4 beans, &c.; 3 beans, &c.; 2 beans, &c.; 1 bean, &c. Show me and read what you have written.

22. Write the figure 6 alone. What does it mean? Write the following, using the figures: 1 and 1 are 2; 1 and 2 are 3; 1 and 3 are 4; 1 and 4 are 5; 1 and 5 are 6; 2 and 1 are 3; 2 and 2 are 4; 2 and 3 are 5; 2 and 4 are 6; 3 and 1 are 4; 3 and 2 are 5; 3 and 3 are 6; 4 and 1 are 5; 4 and 2 are 6; 5 and 1 are 6.

23. We represent the number six by these letters: VI. Represent in letters, one — two — three — four — five — six. What do they mean when used for numbers? Find the lesson in this book numbered VI. Find the lesson numbered IV. [Exercise pupils on the difference.]

24. Make the table required in ¶ 20, and continue one line further.

§ 7.

25. Make seven marks. For this number we use the figure, 7. Write with the figure, 7 beans, &c.; 6 — 5 — 4 — 3 — 2 — 1 beans, &c. Show me and read what you have written.

26. Write the figure 7 alone. What does it mean? Write the following, using the figures: 1 and 1 are 2; 1 and 2 are 3; 1 and 3 are 4; 1 and 4 are 5; 1 and 5 are 6; 1 and 6 are 7; 2 and 1 are 3; 2 and 2 are 4; 2 and 3 are 5; 2 and 4 are 6; 2 and 5 are 7; 3 and 1 are 4; 3 and 2 are 5; 3 and 3 are 6; 3 and 4 are 7; 4 and 1 are 5; 4 and 2 are 6; 4 and 3 are 7; 5 and 1 are 6; 5 and 2 are 7; 6 and 1 are 7.

27. We represent the number seven by these letters: VII. Represent in letters, one — two — three — four — five — six — seven. What do they mean when used for numbers? Find the lesson in this book numbered VII.

28. Make the table required in ¶ 24, and continue one line further.

§ 8.

29. Make eight marks. For this number we use the figure 8. Write with the figure, 8 beans, &c.; 7 — 6 — 5 — 4 — 3 — 2 — 1 beans, &c. Show me and read what you have written.

30. Write the figure 8 alone. What does it mean? Write the following, using the figures: 1 and 1 are 2; 1 and 2 are 3; 1 and 3 are 4; 1 and 4 are 5; 1 and 5 are 6; 1 and 6 are 7; 1 and 7 are 8; 2 and 1 are 3; 2 and 2 are 4; 2 and 3 are 5; 2 and 4 are 6; 2 and 5 are 7; 2 and 6 are 8; 3 and 1 are 4; 3 and 2 are 5; 3 and 3 are 6; 3 and 4 are 7; 3 and 5 are 8; 4 and 1 are 5; 4 and 2 are 6; 4 and 3 are 7; 4 and 4 are 8; 5 and 1 are 6; 5 and 2 are 7; 5 and 3 are 8; 6 and 1 are 7; 6 and 2 are 8; 7 and 1 are 8.

31. We represent the number eight by these letters: VIII.

Represent in letters, one — two — three — four — five — six — seven — eight. What do they mean when used for numbers? Find the lesson in this book numbered VIII.

32. Make the table required in ¶ 28, and continue one line further.

§ 9.

33. Make nine marks. For this number we use the figure 9. Write with the figure, 9 beans, &c.; 8 — 7 — 6 — 5 — 4 — 3 — 2 — 1 beans, &c. Show me and read what you have written.

34. Write the figure 9 alone. What does it mean? Write the following, using the figures; 1 and 1 are 2; 2 and 1 are 3; 3 and 1 are 4; 4 and 1 are 5; 5 and 1 are 6; 6 and 1 are 7; 7 and 1 are 8; 8 and 1 are 9; 1 and 2 are 3; 2 and 2 are 4; 3 and 2 are 5; 4 and 2 are 6; 5 and 2 are 7; 6 and 2 are 8; 7 and 2 are 9; 1 and 3 are 4; 2 and 3 are 5; 3 and 3 are 6; 4 and 3 are 7; 5 and 3 are 8; 6 and 3 are 9; 1 and 4 are 5; 2 and 4 are 6; 3 and 4 are 7; 4 and 4 are 8; 5 and 4 are 9; 1 and 5 are 6; 2 and 5 are 7; 3 and 5 are 8; 4 and 5 are 9; 1 and 6 are 7; 2 and 6 are 8; 3 and 6 are 9; 1 and 7 are 8; 2 and 7 are 9; 1 and 8 are 9.

35. We represent the number 9 by these letters, IX. Represent in letters, one — two — three — four — five — six — seven — eight — nine. What do they mean when used for numbers? Find the lesson in this book numbered IX. [Let it be discriminated from XI., without at present explaining the latter, further than as not IX.]

36. Make the table required in ¶ 32, and continue one line further.

FROM day to day, in the course of the following Exercises, let the Teacher introduce this:

Throw down before the class any number of beans, &c., less than ten, and ask how many there are. Repeat this with different numbers, and continue until the children recognize the number *at sight*, whenever a number less than ten is thrown down.

SIMPLE NUMBERS.

NOTE. — I. In the study and practice of numbers are to be sought these essential things: 1, Correctness of computation; 2, Rapidity of computation; 3, Right principles; 4, Correct and the briefest methods. The first two depend upon proper drill in simple numbers: the others have gradual development as instruction goes on. But in the early stages, drill is all-important. In the following exercises, the drill suggested is recommended to be faithfully carried out: how persistently must depend upon circumstances, and the discretion of the teacher. The more readily the earlier exercises are performed, the easier will be further advances.

II. In needful cases the practical lessons should be made concrete, by the use of objects, the numeral frame and the crayon. If the pupil does not know the result of any problem, let him first find it out for himself by actual work and count. 1. Knowledge; 2. Remembrance. When he knows, so drill him that he shall never forget.

III. Some of the exercises may be more rapidly accomplished than others. The danger, however, is not in too slow, but too rapid progress. The teacher presides so as to insure thoroughness.

IV. Not recitation, but work and drill, are relied upon for successful arithmetical teaching. Definitions and rules are here introduced, not as forms for study and recital, but as topics for illustration. If deemed needful, they may be repeated in connection with the exercises; but they ought not to be given out as tasks.

V. Every one has noted the differing natural abilities of children, regarding the comprehension of numeral ideas. It is unjust and cruel to stigmatize those of slow perceptions as stupid or as dunces; and it only serves to discourage them, and to bar their progress. Simplify and lay well the foundations; and the teacher may obtain a grander crown than he ought to wear for helping on those who can run without help. There may be many bewildered in numeral mire who need only a few planks to give them solid footing. Give them ideas, — rather bring out their ideas, and they will make reasonable progress.

VI. One thing at a time — step by step — from the known to the unknown: these are the principles by which we have sought to be governed in our methods. For the rest, we must depend upon the faithfulness and discretion of the teachers whom this little volume is intended to aid.

CLASSIFICATION. — It will be observed that Exercises 1 to 34 deal with numbers from 1 to 9 inclusive, and no others, in Notation, Numeration, Addition, Subtraction, Multiplication, and Division. Exercises 35 to 73 deal in the same way with numbers from 10 to 19; exercises 74 to 106 with numbers from 20 to 29; exercises 107 to 135 from 30 to 39, and so on. If a class are faultless in addition, it is not needful to dwell on the exercises upon that process, and so as to other processes. The teacher's judgment is to be constantly used with regard to the exercises which are most needful. It is recommended, however, that the Notation Exercises and their drill be not overlooked in any case, commencing with those of Exercise 35.

If the pupil has gone successfully over the preceding lessons, the teacher may find him so ready that the exercises down to xxxiv. may be gone through with some degree of rapidity. The teacher must judge, with reference to thoroughness.

CHAPTER THE FIRST.

One to Nine.

I.

1. To express numbers, we use *nine* characters, or *figures*.

Write the following table upon the blackboard :—

/	One	1
//	Two	2
///	Three	3
////	Four	4
/////	Five	5
////////	Six	6
/////////	Seven	7
//////////	Eight	8
///////////	Nine	9

The teacher, pointing to each line in succession, requires the pupils, singly and by the class, first to count the marks, then read the words, then read the figures. As each line is read, the pupil will write it upon his slate, before proceeding to the next, so that finally he shall have the table complete before him. The slates then being reversed, and all but the figures erased from the board, let the pupils, as the teacher points, read the figures, first in order, and then irregularly.

II.

Read the following numbers :—

1; 2; 3; 4; 9; 8; 7; 6; 5; 4; 3; 2; 1; 9; 2; 8; 3;
7; 6; 5; 4; 8; 7; 9; 5; 6; 1; 3; 5; 7; 9; 1; 2;
4; 6; 8.

Let these be written upon the blackboard, and the pupils drilled singly and collectively, until the figures are instantly recognized and named.

III.

Write the following numbers, in figures :—

One; Two; Three; Four; Five; Six; Seven;
Eight; Nine; Two; Four; Six; Eight; Nine;
Seven; Five; Three; One; Four; Seven; Two;
Five; Eight; Three; Six; Nine; One; Nine;
Eight; Seven; Six; Five; Four; Three; Two.

Let pupils write upon the slate. Be careful that the figures are neatly made. Continue the exercise until each pupil writes *neatly* and *promptly* every one of the nine figures.

IV.

2. The sign *plus*, +, is used to show when several numbers are to be added together, or combined into one. *Plus* means *more*.

3. As a sign of equality, we use the sign =, which we read *equals*. The numbers at the right of this sign ought to be precisely the same in value as those at the left. Thus: $1 + 1 = 2$. This we read; One *plus* One *equals* Two; or, which is the same thing, One and One are Two.

Write upon slate and blackboard* the numbers following, with amounts, according to the form below : Let the whole form a neat table when completed.

FORM:	$1 + 1 = 2$	$5 + 1 = 6.$
	$2 + 1 = 3$	$6 + 1 = 7.$
	$3 + 1 = 4$	$7 + 1 = 8.$

* Let scholars do this.

How many are One and One? Two and One? * Three and One? Four and One? Five and One? Six and One? Seven and One? Eight and One?

How many are One and Two? Two and Two? Three and Two? Four and Two? Five and Two? Six and Two? Seven and Two?

DRILL: This table being placed upon the blackboard, as well as upon the slates, let it be read by pupils, as the teacher points, thus: One plus One equals Two, &c.; then, One and One are Two, &c.; then, the amounts being erased, let them be named at sight of the numbers to be added. Then the board and slates being cleared, let the class be drilled by the questions of the exercise promiscuously, until memory will instantaneously give the correct answers. Then let the scholars quietly reproduce the work.

V.

Write as follows, according to the forms of the last exercise :

How many are One and Three? Two and Three? Three and Three? Four and Three? Five and Three? Six and Three? One and Four? Two and Four? Three and Four? Four and Four? Five and Four? One and Five? Two and Five? Three and Five? Four and Five? One and Six? Two and Six? Three and Six? One and Seven? Two and Seven? One and Eight?

Drill as in Exercise IV.

VI.

Write as follows, according to the forms of Exercise IV.

How many are 8 and 1? 7 and 2? 7 and 1? 6 and 3? 6 and 2? 6 and 1? 5 and 4? 5 and 3? 5 and 2? 5 and 1? 4 and 5? 4 and 4? 4 and 3? 4 and 2? 4 and 1? 3 and 6? 3 and 5? 3 and 4? 3 and 3? 3 and 2? 3 and 1? 2 and 7? 2 and 6? 2 and 5? 2 and 4? 2 and 3? 2 and 2? 2 and 1? 1 and 8? 1 and 7? 1 and 6? 1 and 5? 1 and 4? 1 and 3? 1 and 2?

Drill as in Exercise IV.

* Throughout, all questions are to be filled out.

VII.

Write as follows, according to the forms of Exercise IV.

How many are 1 and 1? 3 and 1? 5 and 1? 7 and 1? 2 and 1? 4 and 1? 6 and 1? 8 and 1? 1 and 2? 3 and 2? 5 and 2? 7 and 2? 2 and 2? 4 and 2? 6 and 2? 1 and 3? 3 and 3? 5 and 3? 2 and 3? 4 and 3? 6 and 3? 1 and 4? 3 and 4? 5 and 4? 2 and 4? 4 and 4? 1 and 5? 3 and 5? 2 and 5? 4 and 5? 1 and 6? 3 and 6? 2 and 6? 1 and 7? 2 and 7? 1 and 8?

Drill as in Exercise IV.

VIII.

Write as follows, according to the forms of Exercise IV.

How many are 1 and 1 and 1? 1 and 1 and 2? 1 and 1 and 3? 1 and 1 and 4? 1 and 1 and 5? 1 and 1 and 6? 1 and 1 and 7? 1 and 2 and 1? 1 and 2 and 2? 1 and 2 and 3? 1 and 2 and 4? 1 and 2 and 5? 1 and 2 and 6? 1 and 3 and 1? 1 and 3 and 2? 1 and 3 and 3? 1 and 3 and 4? 1 and 3 and 5? 1 and 4 and 1? 1 and 4 and 2? 1 and 4 and 3? 1 and 4 and 4? 1 and 5 and 1? 1 and 5 and 2? 1 and 5 and 3?

Drill as in Exercise IV.

IX.

Write as follows, according to the forms of Exercise IV.

How many are 1 and 6 and 1? 1 and 6 and 2? 1 and 7 and 1? 2 and 1 and 1? 2 and 1 and 2? 2 and 1 and 3? 2 and 1 and 4? 2 and 1 and 5? 2 and 1 and 6? 2 and 2 and 1? 2 and 2 and 2? 2 and 2 and 3? 2 and 2 and 4? 2 and 2 and 5? 2 and 3 and 1? 2 and 3 and 2? 2 and 3 and 3? 2 and 3 and 4? 2 and 4 and 1? 2 and 4 and 2? 2 and 4 and 3? 2 and 5 and 1? 2 and 5 and 2? 2 and 6 and 1? 3 and 1 and 1? 3 and 1 and 2? 3 and 1 and 3? 3 and 1 and 4? 3 and 1 and 5?

Drill as in Exercise IV.

X.

Write as follows, according to the forms of Exercise IV.

How many are 3 and 2 and 1? 3 and 2 and 2? 3 and 2 and 3? 3 and 2 and 4? 3 and 3 and 1? 3 and 3 and 2? 3 and 3 and 3? 3 and 4 and 1? 3 and 4 and 2? 3 and 5 and 1? 4 and 1 and 1? 4 and 1 and 2? 4 and 1 and 3? 4 and 1 and 4? 4 and 2 and 1? 4 and 2 and 2? 4 and 2 and 3? 4 and 3 and 1? 4 and 3 and 2? 4 and 4 and 1? 5 and 1 and 1? 5 and 1 and 2? 5 and 1 and 3? 5 and 2 and 1? 5 and 2 and 2? 6 and 1 and 1? 6 and 1 and 2? 6 and 2 and 1? 7 and 1 and 1?

Drill as in Exercise IV.

XI.

4. The writing of numbers we call *Notation*.

5. The reading of numbers we call *Numeration*.

6. The gathering of several numbers into one of equal value we call *Addition*.

Add together the several groups of numbers following, writing the numbers one under the other, with a straight line underneath, and the sum or amount below this.

FORM:	1	2	3
	1	2	2
	1	2	1
	<hr/> 3	<hr/> 6	<hr/> 6

1 + 1 + 7	1 + 6 + 1	2 + 3 + 4	3 + 3 + 1
5 + 2 + 1	1 + 1 + 1	1 + 3 + 5	2 + 2 + 1
3 + 1 + 3	4 + 2 + 1	6 + 1 + 2	1 + 1 + 6
1 + 1 + 2	1 + 4 + 1	2 + 1 + 1	2 + 2 + 4
2 + 5 + 1	3 + 1 + 4	3 + 4 + 2	4 + 2 + 3
7 + 1 + 1	1 + 1 + 3	1 + 3 + 2	1 + 4 + 4
2 + 1 + 4	2 + 3 + 1	2 + 4 + 1	3 + 1 + 5

DRILL: To be read, as the teacher points, first, One and One are Two, and Seven are Nine, &c.; then, Seven and One are Eight, and One are Nine,

&c.; then, One, Two, Nine, &c.; then, Seven, Eight, Nine, &c.; then, the amounts being erased, these are to be stated at sight of the figures to be added; then, the board and slates being cleared, let there be a *memoriter* drill, and afterward the reproduction of the lesson.

XII.

Write as follows, according to the forms of Exercise XI.

$4 + 1 + 1$	$4 + 4 + 1$	$5 + 2 + 2$	$1 + 1 + 4$
$1 + 3 + 3$	$1 + 5 + 3$	$2 + 1 + 6$	$2 + 3 + 2$
$3 + 2 + 1$	$4 + 1 + 2$	$4 + 3 + 1$	$6 + 2 + 1$
$1 + 1 + 5$	$1 + 3 + 1$	$1 + 4 + 2$	$1 + 6 + 2$
$2 + 2 + 2$	$2 + 3 + 3$	$2 + 4 + 2$	$2 + 6 + 1$
$3 + 2 + 2$	$3 + 5 + 1$	$4 + 1 + 3$	$6 + 1 + 1$
$1 + 2 + 1$	$1 + 2 + 6$	$1 + 4 + 3$	$2 + 1 + 2$
$2 + 2 + 5$			

Drill as in Exercise XI.

XIII.

Write as follows, according to the forms of Exercise XI.

$2 + 4 + 3$	$3 + 2 + 3$	$4 + 1 + 4$	$5 + 1 + 2$
$1 + 2 + 2$	$1 + 3 + 4$	$1 + 5 + 1$	$1 + 7 + 1$
$2 + 1 + 3$	$2 + 1 + 5$	$5 + 1 + 3$	$2 + 5 + 2$
$3 + 4 + 1$	$1 + 2 + 3$	$5 + 1 + 1$	$1 + 2 + 5$
$3 + 3 + 2$	$1 + 2 + 4$	$4 + 3 + 2$	$1 + 5 + 2$
$2 + 2 + 3$	$4 + 2 + 2$	$3 + 3 + 3$	$3 + 1 + 1$
$3 + 2 + 4$	$3 + 1 + 2$		

Drill as in Exercise XI.

XIV.

Write as follows, according to the forms of Exercise XI.

$1 + 1 + 1 + 1$	$1 + 1 + 1 + 2$	$1 + 1 + 1 + 3$
$1 + 1 + 1 + 4$	$1 + 1 + 1 + 5$	$1 + 1 + 1 + 6$
$1 + 1 + 2 + 1$	$1 + 1 + 2 + 2$	$1 + 1 + 2 + 3$
$1 + 1 + 2 + 4$	$1 + 1 + 2 + 5$	$1 + 1 + 3 + 1$
$1 + 1 + 3 + 2$	$1 + 1 + 3 + 3$	$1 + 1 + 3 + 4$
$1 + 1 + 4 + 1$	$1 + 1 + 4 + 2$	$1 + 1 + 4 + 3$

$1+1+5+1$	$1+1+5+2$	$1+1+6+1$
$1+2+1+1$	$1+2+1+2$	$1+2+1+3$
$1+2+1+4$	$1+2+1+5$	$1+2+2+1$
$1+2+2+2$	$1+2+2+3$	$1+2+2+4$
$1+2+3+1$	$1+2+3+2$	$1+2+3+3$

Drill as in Exercise XI.

XV.

Write as follows, according to the forms of Exercise XI.

$1+2+4+1$	$1+2+4+2$	$1+2+5+1$
$1+3+1+1$	$1+3+1+2$	$1+3+1+3$
$1+3+1+4$	$1+3+2+1$	$1+3+2+2$
$1+3+2+3$	$1+3+3+1$	$1+3+3+2$
$1+3+4+1$	$1+4+1+1$	$1+4+1+2$
$1+4+1+3$	$1+4+2+1$	$1+4+2+2$
$1+5+1+1$	$1+5+1+2$	$1+5+2+1$
$1+6+1+1$	$2+1+1+1$	$2+1+1+2$
$2+1+1+3$	$2+1+1+4$	$2+1+1+5$
$2+1+2+1$	$2+1+2+2$	$2+1+2+3$
$2+1+2+4$	$2+1+3+1$	

Drill as in Exercise XI.

XVI.

Write as follows, according to the forms of Exercise XI.

$2+1+4+1$	$2+1+3+2$	$2+1+3+3$
$2+2+1+2$	$2+1+4+2$	$2+1+5+1$
$2+2+2+1$	$2+2+1+3$	$2+2+1+4$
$2+2+3+1$	$2+2+2+2$	$2+2+2+3$
$2+3+1+1$	$2+2+3+2$	$2+2+4+1$
$2+3+2+1$	$2+3+1+2$	$2+3+1+3$
$2+4+1+2$	$2+3+2+2$	$2+4+1+1$
$3+1+1+1$	$2+4+2+1$	$2+5+1+1$
$3+1+1+4$	$3+1+1+2$	$3+1+1+3$
$3+1+2+3$	$3+1+2+1$	$3+1+2+2$
$3+1+4+1$	$3+1+3+1$	$3+1+3+2$

Drill as in Exercise XI.

XVII.

Write as follows, according to the forms of Exercise XI.

$3 + 2 + 1 + 1$	$3 + 2 + 1 + 2$	$3 + 2 + 1 + 3$
$3 + 2 + 2 + 1$	$3 + 2 + 2 + 2$	$3 + 2 + 3 + 1$
$3 + 3 + 1 + 1$	$3 + 3 + 1 + 2$	$3 + 3 + 2 + 1$
$3 + 4 + 1 + 1$	$4 + 1 + 1 + 1$	$4 + 1 + 1 + 2$
$4 + 1 + 1 + 3$	$4 + 1 + 2 + 1$	$4 + 1 + 2 + 2$
$4 + 1 + 3 + 1$	$4 + 2 + 1 + 1$	$4 + 2 + 1 + 2$
$4 + 2 + 2 + 1$	$4 + 3 + 1 + 1$	$5 + 1 + 2 + 1$
$1 + 1 + 1 + 1 + 1$	$1 + 1 + 2 + 1 + 1$	
$1 + 1 + 3 + 1 + 1$	$1 + 1 + 4 + 1 + 1$	
$1 + 1 + 5 + 1 + 1$	$2 + 2 + 1 + 2 + 2$	
$3 + 3 + 1 + 1 + 1$	$1 + 2 + 3 + 2 + 1$	
$3 + 1 + 3 + 1 + 1$	$2 + 1 + 3 + 2 + 1$	

Drill as in Exercise XI.

XVIII.

One and One are how many? What number added to One will make Two? What is the difference between One and Two? If One is taken from Two, how many will remain?

Two and Three are how many? What number added to Two will make Five? What number added to Three will make Five? What is the difference between Two and Five? What is the difference between Three and Five? If Two are taken from Five, how many will remain? If Three are taken from Five, how many will remain?

7. The sign of difference is —, which we read *minus*, meaning *less*. The number to be taken is placed after the sign: the number from which it is to be taken, before it. Thus: $2 - 1 = 1$, which we read, Two *minus* One *equals* One, or, One from Two, leaves One.

Write the following groups of numbers, with amounts or differences, as the case may be:

FORM: $1 + 1 = 2$ $2 + 3 = 5$
 $2 - 1 = 1$ $5 - 3 = 2$

How many are 8 and 1? 7 and 1? 6 and 1? 5 and 1? 4 and 1? 3 and 1? 2 and 1? 1 and 1?

What is the difference between 9 and 1? between 8 and 1? between 7 and 1? between 6 and 1? between 5 and 1? between 4 and 1? between 3 and 1? between 2 and 1?

Read, the teacher pointing, first, Eight plus One equals Nine, &c.;—Nine minus One equals Eight, &c.;—then, the sums and differences erased, let the amounts and differences be stated at sight of the numbers and signs; then a *memoriter* drill. After which, the reproduction of the lesson.

XIX.

Write as follows, according to the forms of Exercise XVIII.

How many are 7 and 2? 6 and 2? 5 and 2? 4 and 2? 3 and 2? 2 and 2? 1 and 2?

What is the difference between 9 and 2? between 8 and 2? between 7 and 2? between 6 and 2? between 5 and 2? between 4 and 2? between 3 and 2?

How many are 6 and 3? 5 and 3? 4 and 3? 3 and 3? 2 and 3? 1 and 3?

What is the difference between 9 and 3? between 8 and 3? between 7 and 3? between 6 and 3? between 5 and 3? between 4 and 3?

Drill as in Exercise XVIII.

XX.

Write as follows, according to the forms of Exercise XVIII.

How many are 5 and 4? 4 and 4? 3 and 4? 2 and 4? 1 and 4?

What is the difference between 9 and 4? between 8 and 4? between 7 and 4? between 6 and 4? between 5 and 4?

How many are 4 and 5? 3 and 5? 2 and 5? 1 and 5?

What is the difference between 9 and 5? between 8 and 5? between 7 and 5; between 6 and 5?

How many are 3 and 6? 2 and 6? 1 and 6? 2 and 7? 1 and 7? 1 and 8?

What is the difference between 9 and 6? between 8 and 6? between 7 and 6? between 9 and 7? between 8 and 7? between 9 and 8?

Drill as in Exercise XVIII.

XXI.

Write as follows, according to the forms of Exercise XVIII.

Add 4 and 5; 4 and 3; 4 and 1; 3 and 6; 3 and 4; 3 and 2; 4 and 4; 2 and 6; 6 and 2; 1 and 8; 1 and 6; 7 and 2; 1 and 4; 5 and 4; 5 and 2; 8 and 1; 1 and 1.

Take 4 from 9: how many remain? 4 from 7? 4 from 5? 3 from 9? 3 from 7? 3 from 5? 4 from 8? 2 from 8? 6 from 8? 1 from 9? 1 from 7? 7 from 9? 1 from 5? 5 from 9? 5 from 7? 8 from 9? 1 from 2?

Drill as in Exercise XVIII.

XXII.

Write as follows, according to the forms of Exercise XVIII.

Add 4 and 2; 3 and 5; 7 and 1; 6 and 3; 6 and 1; 5 and 3; 5 and 1; 3 and 3; 3 and 1; 1 and 7; 1 and 5; 1 and 3; 1 and 2; 2 and 7; 2 and 5; 2 and 4; 2 and 3; 2 and 2; 2 and 1.

Take 4 from 6: how many remain? 3 from 8? 7 from 8? 6 from 9? 6 from 7? 5 from 8? 5 from 6? 3 from 6? 3 from 4? 1 from 8? 1 from 6? 1 from 4? 1 from 3? 2 from 9? 2 from 7? 2 from 6? 2 from 5? 2 from 4? 2 from 3?

Drill as in Exercise XVIII.

XXIII.

8. Finding the difference between two numbers, — that is, finding what remains when one number is taken from another, is called *Subtraction*.

Write the following subtractions, the smaller number underneath the larger, below them a straight line, with the remainder under that.

FORM :	2	6	9
	$\frac{1}{1}$	$\frac{4}{2}$	$\frac{1}{8}$

Subtract 2 from 7 ; 1 from 8 ; 3 from 4 ; 1 from 6 ; 4 from 9 ; 5 from 8 ; 1 from 9 ; 6 from 7 ; 2 from 6 ; 1 from 7 ; 8 from 9 ; 2 from 5 ; 4 from 8 ; 5 from 9 ; 1 from 5 ; 7 from 9 ; 6 from 8 ; 1 from 4.

Read, the teacher pointing, first, 7 minus 2 equals 5, &c. ; then, 2 from 7 leaves 5, &c. ; then, adding remainders to the subtracted number, show how the sum equals the other given number, thus, 2 and 5 are 7, &c. ; then, erasing remainders, let them be stated at sight; then a *memoriter* drill, and the reproduction.

XXIV.

Write as in Exercise XXIII.

Subtract 7 from 8 ; 6 from 9 ; 5 from 7 ; 1 from 3 ; 5 from 6 ; 1 from 2 ; 4 from 7 ; 3 from 8 ; 4 from 6 ; 2 from 9 ; 2 from 8 ; 3 from 9 ; 3 from 7 ; 2 from 4 ; 3 from 6 ; 4 from 5 ; 3 from 5 ; 2 from 3.

Drill as in Exercise XXIII.

XXV.

Write the following groups of numbers, with results.

FORM :	$1 + 4 - 2 = 3$
	$3 + 6 - 4 = 5$
	$9 - 7 + 4 = 6$
	$1 + 1 - 2 = \text{Nothing.}$

$3+6-1 \bullet$	$2+6-5$	$4+4-2$	$5-3+7$
$6+1-3$	$9-8+7$	$8+1-4$	$1+7-3$
$6-5+4$	$4+3-1$	$7-4+6$	$3+3+2$
$3-2+8$	$3+2-4$	$3+4+2$	$6-1-1$
$9-1-2$	$8-4+3$	$8-1-1$	$7+1-5$
$7-1-1$	$8+1-2$	$8-1-2$	$8-1+2$
$4+2-3$	$5+4-3$	$5-4+3$	

Read, first, 3, plus 6, minus 1, equals 8, &c.: then, erasing results, let these be stated at sight; then, a *memoriter* drill, and the reproduction.

XXVI.

Write as in Exercise XXV.

$1+7+1$	$1+7-1$	$6+2-4$	$8-1-4$
$4+5-1$	$4+4-5$	$5+3-7$	$2-1+8$
$4+4-8$	$6-3-3$	$7+2-6$	$4+4+1$
$4+4-1$	$4-4+1$	$1+7-2$	$3+3+2$
$8-2-3$	$8-2+3$	$1+6-2$	$2+7-9$
$2+7-4$	$7-4-2$	$5-3+7$	$3+3-2$
$8-2-2$	$9-3-3$	$8-3-3$	

Drill as in Exercise XXV.

XXVII.

Add One and One. One taken two times are how many? Two times One are how many? Twice One are how many?

Add One, and One, and One. One taken three times are how many? Three times One are how many?

9. Reckoning how many will be produced by taking the same number a certain number of times is called *Multiplication*.

10. The sign of multiplication is \times , which may be read, *multiplied by*.

Thus: $1 \times 2 = 2$; read, One multiplied by Two equals Two; or, Twice One are Two, in the latter case first reading the number after the sign. But in reality the result is the same whichever is first read: 3×2 is the same as 2×3 ; 4×2 the same as 2×4 , and so on. Just as $2 + 3$ is the same as $3 + 2$; $2 + 4$ the same as $4 + 2$, and so on. This is not true, however, of numbers with the sign $-$.

Write the following multiplications and additions:

FORM: $2 \times 1 = 2$ $2 + 1 = 3$
 $3 \times 1 = 3$ $3 + 1 = 4$

Add together 2 ones; 3 ones; 4 ones; 5 ones; 6 ones; 7 ones; 8 ones; 9 ones. Multiply 1 by 2; 1 by 3; 1 by 4; 1 by 5; 1 by 6; 1 by 7; 1 by 8; 1 by 9.

Add 2 and 2; 2, and 2, and 2; 2, and 2, and 2, and 2. Multiply 2 by 2; 2 by 3; 2 by 4. Add 3 and 3; 3, and 3, and 3. Multiply 3 by 2; 3 by 3. Add 4 and 4. Multiply 4 by 2.

Read the multiplications, first, 1 multiplied by 2 equals 2, &c.; then Twice 1 are 2, &c.; then, 2 ones are 2, &c.: the additions as in former exercises. Then, erasing results, let these be stated at sight. Then, a *memoriter* drill, and the reproduction.

XXVIII.

Write the following, according to the forms of Exercise XXVII.

8 Ones are how many? 6 Ones? 4 Twos? 2 Twos? 7 Ones? 3 Threes? 2 Ones? 5 Ones? 3 Twos? 9 Ones? 4 Twos? 4 Ones? 2 Threes? 3 Ones? 2 Fours?

7×1	4×2	2×2	2×4	8×1
2×1	2×3	6×1	3×3	5×1
3×2	9×1	4×1	3×1	

Drill as in Exercise XXVII.

XXIX.

Two times Two are how many? What number multiplied by Two will make Four? Two times what number make Four? Two is contained in Four how many times?

Two times Three are how many? What number multiplied by Two will make Six? Three times Two are how many? What number multiplied by Three will make Six? Two times what number will make Six? Three times what

number will make Six? Two is contained in Six how many times? Three is contained in Six how many times?

11. Finding how many times one number is contained in another is called *Division*.

12. The sign of division is \div , read *divided by*.

Thus: $4 \div 2 = 2$; Four divided by Two equals Two; or, Two is contained in Four, Twice.

Write the following divisions:

FORM: $4 \div 2 = 2$

$8 \div 8 = 1$

$6 \div 1 = 6$

How many times is 3 contained in 9? 9 in 9? 3 in 6? 6 in 6? 1 in 9? 1 in 6? 3 in 3? 2 in 8? 8 in 8? 1 in 8? 4 in 8? 2 in 6? 2 in 4? 4 in 4? 1 in 4? 2 in 2? 1 in 2? 7 in 7? 1 in 7? 5 in 5? 1 in 5? 1 in 3? 1 in 1?

Read, first, 9 divided by 3 equals 3, &c.; then, 3 in 9, 3 times, &c.; then multiply the quotient by the divisor, and show that this produces the dividend. Then, erasing results, let these be given at sight. Then, a *memoriter* drill, and the reproduction.

XXX.

Write as follows, as in Exercise XXIX.

Divide 9 by 9; 9 by 3; 9 by 1; 8 by 8; 8 by 4; 8 by 2; 8 by 1; 7 by 7; 7 by 1; 6 by 6; 6 by 3; 6 by 2; 6 by 1; 5 by 5; 5 by 1; 4 by 4; 4 by 2; 4 by 1; 3 by 3; 3 by 1; 2 by 2; 2 by 1.

$9 \div 3$ $8 \div 4$ $7 \div 1$ $6 \div 2$ $5 \div 5$ $4 \div 2$

$3 \div 1$ $2 \div 2$ $9 \div 9$ $8 \div 2$ $7 \div 7$ $6 \div 3$

$5 \div 1$ $4 \div 4$ $3 \div 3$ $2 \div 1$ $9 \div 1$ $8 \div 1$

$6 \div 6$ $4 \div 1$ $8 \div 8$ $6 \div 1$

Drill as in Exercise XXIX.

XXXI.

13. In Division, the number to be divided is called the *dividend*.

14. The number by which we are to divide,—that of which we are to find the number of times it is contained in the dividend, is called the *divisor*.

15. There is another sign of division; a line drawn between the dividend and divisor, the former being placed above the latter. Thus: $\frac{4}{2} = 2$; read, Four divided by Two equals Two, or, Two is contained in Four, Twice.

Write the divisions set forth in Exercise XXX.

FORM: $\frac{4}{2} = 2$
 $\frac{8}{2} = 1$
 $\frac{24}{4} = 6$

Drill as in Exercise XXIX.

XXXII.

Write the following groups, with results, according to the forms already prescribed.

$8 + 1$	$8 - 1$	8×1	$8 \div 1$	$9 - 1$	9×1
$9 \div 1$	7×1	$7 + 1$	$7 - 1$	$6 + 1$	6×1
$6 - 1$	$9 - 2$	$8 \div 2$	$8 - 2$	$7 + 2$	$7 - 2$
$6 \div 2$	$6 - 2$	$6 + 2$	$5 + 4$	$5 - 4$	$4 + 3$
$4 - 3$	$4 - 2$	$9 - 3$	$9 \div 3$	$3 + 5$	$5 - 3$
2×3	$3 + 2$	$4 + 4$	2×2	$4 + 2$	$5 - 1$
$5 \div 5$	5×1	$5 \div 1$			

Drill as in previous exercises.

XXXIII.

Write as in Exercise XXXII.

$6 + 3$	$6 \div 3$	$6 - 3$	4×2	$4 \div 2$	$8 - 2$
$5 - 2$	$5 + 2$	$3 - 2$	3×2	$2 - 1$	2×1
$2 + 1$	$2 \div 1$	$2 - 2$	$8 - 3$	$4 - 3$	$7 - 3$
$9 - 4$	$8 - 4$	$8 \div 4$	$7 - 4$	2×4	$6 - 4$
$2 + 6$	$9 - 5$	$2 + 7$	$8 - 5$	$7 - 5$	$6 - 5$
$2 + 3$	$9 - 6$	$2 + 4$	$8 - 6$	$2 + 5$	$7 - 6$

$$\begin{array}{llllll}
 3+1 & 9-7 & 3-1 & 3\div 1 & 8-7 & 3+3 \\
 3\times 3 & 3+4 & 3+6 & 4+1 & 4-1 & 4\times 1 \\
 4\div 1 & & & & &
 \end{array}$$

$$\begin{array}{ll}
 3+2+4-7\times 4\div 2 & 2+6-5\times 3-3\div 2 \\
 9-7+5+1\div 4\times 3 & 4+5\div 3\times 2-4\times 3 \\
 8-4+3-2\div 5\times 8 & 7+2-4+3\div 2+3 \\
 8\div 4\times 3+2-5+6 & 7-2+4\div 3+2-3 \\
 6-5\times 9\div 3+5\div 2 & 6+3-5\div 2+7-5 \\
 9-5\times 2-3+4-6 & 1+2+3-4+5-6 \\
 9-8+7-6+5-4 &
 \end{array}$$

Drill as in previous exercises.

XXXIV.

Mental.

How many marks would there be on the blackboard, if 3 were in one group, and 6 in the other? 2 in one, and 5 in the other? * 7 in one, and 2 in the other? 4 in one, and 4 in the other? 2 in one, and 6 in the other?

In a group of children are 3 boys and 5 girls, — how many altogether? 2 boys and 3 girls? 4 boys and 3 girls? 6 boys and 2 girls? 5 girls and 4 boys?

How many would remain in a class of 9 scholars, if 3 were dismissed? if 4? if 7? if 2? if 8? if 1? if 5? if 6?

How many boys in a class of 8 pupils, if 3 of these are girls? if 5? if 7? if 8? if 1? if 4? if 6? if 2?

There are 2 rows of desks, and 4 in each row: how many in all? 3 rows, 3 in each row? 2 rows, 2 in each row? 3 rows, 2 in each row? 2 rows, 3 in each row? 4 rows, 2 in each row?

A teacher would divide a class of 9 pupils into 3 equal sections: how many scholars in each section? a class of 6 into 3 sections? into 2 sections? a class of 8 into 2 sections? into 4 sections?

Reproduce.

* In all cases, let the skeleton questions be filled out.

CHAPTER THE SECOND.

Ten to Nineteen.

XXXV.

§ 1.

An Object Lesson.

1. Make nine marks upon the blackboard: make one more. Here are ten marks: count them. Nine marks and one mark are how many? Nine and one are how many? One and nine? Eight and two? Two and eight? Seven and three? Three and seven? Six and four? Four and six? Five and five? [If there is any doubt, let the scholar make the necessary marks, and count them.]

2. From ten take one: how many remain? Take two? three? four? five? six? seven? eight? nine? Count from ten, backward.

3. Two fives are how many? Five twos?

4. Divide ten into two equal portions: into five.

§ 2.

5. Ten marks and one mark make eleven marks: count them. Ten and one are how many? One and ten? Nine and two? Two and nine? Eight and three? Three and eight? Seven and four? Four and seven? Six and five? Five and six?

6. From eleven take one; two; three; four; five; six; seven; eight; nine. Count from eleven, backward.

§ 3.

7. Eleven marks and one mark make twelve marks: count them. Ten and two are how many? Nine and three? Eight and four? Seven and five? Six and six? Five and seven? Four and eight? Three and nine?

8. From twelve take one; two; three; four; five; six; seven; eight; nine.

9. Two sixes are how many? Three fours? Four threes? Six twos? Twelve ones?

10. Divide twelve into two equal parts; into three; into four; into six.

§ 4.

11. Twelve marks and one mark are thirteen marks: count them. Twelve and one are how many? Eleven and two? Ten and three? Nine and four? Eight and five? Seven and six? Six and seven? Five and eight? Four and nine?

12. From thirteen take one; two; three; four; five; six; seven; eight; nine. Count backward from thirteen.

§ 5.

13. Thirteen marks and one mark are fourteen marks: count them. Thirteen and one are how many? Twelve and two? Eleven and Three? Ten and four? Nine and five? Eight and six? Seven and seven? Six and eight? Five and nine?

14. From fourteen take one; two; three; four; five; six; seven; eight; nine. Count from fourteen backward.

15. Two sevens are how many? Seven twos?

16. Divide fourteen into two equal parts; into seven.

§ 6.

17. Fourteen marks and one mark are fifteen marks: count them. Fourteen and one are how many? Thirteen and two? Twelve and three? Eleven and four? Ten and five? Nine and six? Eight and seven? Seven and eight? Six and nine?

18. From fifteen take one; two; three; four; five; six; seven; eight; nine; ten. Count from fifteen backward.

19. Three fives are how many? Five threes?

20. Divide fifteen into three equal parts; into five.

§ 7.

21. Fifteen marks and one mark make sixteen marks : count them. Fifteen and one are how many? Fourteen and two? Thirteen and three? Twelve and four? Eleven and five? Ten and six? Nine and seven? Eight and eight? Seven and nine?

22. From sixteen take one; two; three; four; five; six; seven; eight; nine. Count from sixteen backward.

23. Two eights are how many? Four fours? Eight twos?

24. Divide sixteen into two equal parts; into four; into eight.

§ 8.

25. Sixteen marks and one mark make seventeen marks : count them. Sixteen and one are how many? Fifteen and two? Fourteen and three? Thirteen and four? Twelve and five? Eleven and six? Ten and seven? Nine and eight? Eight and nine?

26. From seventeen take one; two; three; four; five; six; seven; eight; nine. Count from seventeen backward.

§ 9.

27. Seventeen marks and one mark make eighteen marks : count them. Seventeen and one are how many? Sixteen and two? Fifteen and three? Fourteen and four? Thirteen and five? Twelve and six? Eleven and seven? Ten and eight? Nine and nine?

28. From eighteen take one; two; three; four; five; six; seven; eight; nine. Count from eighteen backward.

29. Two nines are how many? Three sixes? Six threes? Nine twos?

30. Divide eighteen into two equal parts; into three; into six; into nine.

§ 10.

31. Eighteen marks and one mark are nineteen marks.

Eighteen and one are. how many? Seventeen and two? Sixteen and three? Fifteen and four? Fourteen and five? Thirteen and six? Twelve and seven? Eleven and eight? Ten and nine?

32. From nineteen take one; two; three; four; five; six; seven; eight; nine. Count from nineteen backward.

§ 11.

33. If we wish to represent ten in a letter, we use a capital X; Eleven, or ten and one, XI; Twelve, or ten and two, XII; Thirteen, or ten and three, XIII; Fourteen, or ten and four, XIV; Fifteen, or ten and five, XV; Sixteen, or ten and six, XVI; Seventeen, or ten and seven, XVII; Eighteen, or ten and eight, XVIII; Nineteen, or ten and nine, XIX. For the numbers after ten up to nineteen, we first write the letter for ten, X, and then the letters for the number remaining beyond ten. Write the letters for all the numbers from one to nineteen.*

XXXVI.

16. Besides the nine figures we have been using, to express number, we have a *cipher*, 0, to signify *naught*, or *nothing*. This is employed, when needful, to fill places otherwise vacant. It always means *nothing*.

17. When we have written 1, 2, 3, 4, 5, 6, 7, 8, 9, we have used all the figures provided, with which to express numbers. To write larger numbers, we repeat these figures, but make them of greater value by changing their place.

18. $9 + 1 = \text{Ten} = \text{Ten Ones} = \text{One Ten}$. To write *Ten*, we put 1 to the left of the place where it would mean *One*, and then in *this* place put a *cipher*, thus: 10. 1 in the second place always stands for 1 *Ten*, or *Ten Ones*, or *Ten*. $10 = \text{Ten} + \text{Nothing}$.

* The teacher will give these out, not only in order, but promiscuously.

Write the following table upon the blackboard :

Ten = Ten + Nothing,	10
Eleven = Ten + One,	11
Twelve = Ten + Two,	12
Thirteen = Ten + Three,	13
Fourteen = Ten + Four,	14
Fifteen = Ten + Five,	15
Sixteen = Ten + Six,	16
Seventeen = Ten + Seven,	17
Eighteen = Ten + Eight,	18
Nineteen = Ten + Nine,	19

The teacher, pointing to each line successively, requires the pupils singly and collectively, first to read the name of the number, then the analysis, then the figures. As each line is read, the pupils will write it upon their slates, before proceeding to the next, so that finally they will have before them the table complete. The slates then being reversed, and all but the figures erased from the board, let the pupils read these first regularly backward and forward, and then irregularly. Let the pupils then analyze each number thus: 1 Ten; 1 Ten and 1 One; 1 Ten and 2 Ones, &c., in order and irregularly. Then let them read, in order and irregularly, the single figures according to their value, thus: pointing to the 6 in 16, the reply will be 6; to the 1, 10. "Why do you reckon the 1 as *ten*?" "Because it is in the second place"

XXXVII.

Read the following numbers.

0; 7; 19; 10; 5; 3; 1; 18; 16; 2; 4; 17; 6; 15;
14; 8; 11; 13; 9; 12; 19; 18; 17; 16; 12; 11; 10;
15; 14; 13; 9; 8; 7; 6; 3; 2; 1; 5; 4; 0.

These being placed upon the blackboard, let the pupils be thoroughly drilled in reading until every number is promptly named. Then let the numbers occupying two places be read analytically, the pupils being led to name the 1 in the second place, Ten. Thus, the cipher in 10, they are to read *Nothing*, the 1, *Ten*; in 11, the right hand 1 is *One*, — the other, *Ten*, &c. Then let them read in this form, 10, *Ten*; 11, *Ten + One*, &c. See Exercise XXXVI.

XXXVIII.

Write the following numbers, in figures :

One ; Two ; Three ; Four ; Five ; Six ; Seven ; Eight ; Nine ; Ten ; Eleven ; Twelve ; Thirteen ; Fourteen ; Fifteen ; Sixteen ; Seventeen ; Eighteen ; Nineteen ; One ; Ten ; Seven ; Seventeen ; Four ; Fourteen ; Eight ; Eighteen ; Two ; Twelve ; Nine ; Nineteen ; Six ; Sixteen ; One ; Eleven ; Three ; Thirteen ; Five ; Fifteen ; Nineteen ; Eighteen ; Seventeen ; Sixteen ; Fifteen ; Fourteen ; Thirteen ; Eleven ; Ten ; Nothing.

Continue the exercise, until each pupil writes neatly and promptly every number up to 19. Let scholars read and analyze.

XXXIX.

Count from 1 to 19.

Write the following additions :

$$\begin{array}{l} \text{Form:} \quad 1 + 3 = 4 \\ \quad \quad 7 + 2 = 9 \\ \quad \quad 4 + 4 = 8 \end{array}$$

9 and 1 are how many? 10 and 1? 11 and 1? 12 and 1? 13 and 1? 14 and 1? 15 and 1? 16 and 1? 17 and 1? 18 and 1? 8 and 2? 10 and 2? 12 and 2? 14 and 2? 16 and 2? 9 and 2? 11 and 2? 13 and 2? 15 and 2? 17 and 2? 7 and 3? 10 and 3? 13 and 3? 16 and 3? 8 and 3? 11 and 3? 14 and 3? 9 and 3? 12 and 3? 15 and 3?

DRILL: Read thus, Nine plus one equals ten, &c.: then nine and one are ten, &c.; then let the numbers occupying two places be analyzed, as in Exercise XXXVII; then erasing amounts let them be named at sight; then a *memoriter* drill, and the reproduction.

XL.

Count by twos from 1 to 19, and from 2 to 18: 1, 3, 5, &c.; 2, 4, 6, &c.

Write the following additions, as in Exercise XXXIX.

6 and 4 are how many? 10 and 4? 14 and 4? 7 and 4?
11 and 4? 15 and 4? 8 and 4? 12 and 4? 9 and 4? 13 and
4? 5 and 5? 10 and 5? 6 and 5? 11 and 5? 7 and 5? 12
and 5? 8 and 5? 13 and 5? 9 and 5? 14 and 5? 4 and 6?
10 and 6? 5 and 6? 11 and 6? 6 and 6? 12 and 6? 7 and
6? 13 and 6? 8 and 6? 9 and 6?

Drill as in Exercise XXXIX.

XLI.

Count by threes, from 1 to 19, 2 to 17, 3 to 18.

Write the following additions, as in Exercise XXXIX.

3 and 7 are how many? 10 and 7? 4 and 7? 11 and 7?
5 and 7? 12 and 7? 6 and 7? 7 and 7? 8 and 7? 9 and 7?
2 and 8? 10 and 8? 3 and 8? 11 and 8? 4 and 8? 5 and 8?
6 and 8? 7 and 8? 8 and 8? 9 and 8? 1 and 9? 10 and 9?
2 and 9? 3 and 9? 4 and 9? 5 and 9? 6 and 9? 7 and 9?
8 and 9? 9 and 9?

Drill as in Exercise XXXIX.

XLII.

Write the following additions, according to the forms of Exercise XXXIX.

1 + 2 + 3	2 + 3 + 4	3 + 4 + 5	4 + 5 + 6
5 + 6 + 7	1 + 3 + 4	2 + 4 + 5	3 + 5 + 6
4 + 6 + 7	5 + 7 + 7	1 + 4 + 5	2 + 5 + 6
3 + 6 + 7	4 + 7 + 8	1 + 5 + 6	2 + 6 + 7
3 + 7 + 8	4 + 8 + 7	1 + 6 + 7	2 + 7 + 8
3 + 8 + 8	1 + 7 + 8	2 + 8 + 9	17 + 1 + 1
16 + 2 + 1	8 + 7 + 4	9 + 6 + 3	15 + 2 + 2
3 + 3 + 12			

Drill as in Exercise XXXIX.

XLIII.

Write the following additions, according to the forms of Exercise XXXIX.

$2+2+11$	$7+6+6$	$7+7+4$	$3+12+3$
$7+5+4$	$8+7+1$	$10+2+6$	$14+2+3$
$7+9+2$	$8+4+4$	$9+4+5$	$9+6+4$
$8+5+3$	$13+3+3$	$12+2+4$	$8+6+3$
$5+8+6$	$3+6+1$	$2+6+5$	$4+4+2$
$5+3+7$	$6+1+3$	$9+8+2$	$8+1+4$
$11+7+1$	$6+8+3$	$2+7+9$	$9+4+2$
$8+8+2$			

Drill as in Exercise XXXIX.

XLIV.

Write the following additions, carefully placing in an even column the figures standing for *Ones*, or *Units*, and in an even column just to the left of this the figures standing for *Ten*. That is, write the Units, or Ones, in the first place, and the Tens in the second place.

FORM:	10.	3	2
	2	5	4
	1	4	3
	<hr/>	<hr/>	<hr/>
	13	12	9

$1+1+2$	$2+2+1$	$3+1+1$	$2+2+2$
$3+1+2$	$4+1+1$	$1+2+4$	$2+2+3$
$3+3+1$	$5+1+1$	$4+2+1$	$2+2+4$
$1+2+5$	$3+2+3$	$4+1+3$	$4+2+2$
$4+3+1$	$1+2+6$	$5+3+1$	$4+4+1$
$1+5+3$	$6+1+2$	$7+1+1$	$2+5+2$
$4+2+3$	$3+3+3$	$1+1+8$	$2+1+7$

$5 + 1 + 4$	$1 + 6 + 3$	$2 + 2 + 6$	$2 + 3 + 5$
$4 + 2 + 4$	$2 + 1 + 7$	$3 + 3 + 4$	$1 + 9 + 1$
$8 + 2 + 1$	$3 + 1 + 7$	$6 + 1 + 4$	$5 + 5 + 1$
$2 + 2 + 7$	$6 + 2 + 3$	$4 + 5 + 2$	$3 + 3 + 5$

DRILL: Read, first, one and one are two and two are four, &c.; then, two and one are three and one are four, &c.; then, one, two, four, &c.; then, two, three, four, &c.; then analyze the numbers occupying two places; then, erasing amounts, let these be stated at sight; then, a *memoriter* drill, and the reproduction.

XLV.

Write as in Exercise XLIV.

$4 + 3 + 4$	$10 + 1 + 1$	$2 + 1 + 9$	$8 + 1 + 3$
$4 + 1 + 7$	$1 + 5 + 6$	$2 + 2 + 8$	$7 + 2 + 3$
$4 + 2 + 6$	$5 + 2 + 5$	$3 + 3 + 6$	$4 + 5 + 3$
$4 + 4 + 4$	$1 + 11 + 1$	$1 + 2 + 10$	$3 + 9 + 1$
$4 + 1 + 8$	$1 + 7 + 5$	$6 + 1 + 6$	$2 + 2 + 9$
$2 + 8 + 3$	$4 + 2 + 7$	$2 + 6 + 5$	$3 + 3 + 7$
$3 + 6 + 4$	$3 + 5 + 5$	$4 + 4 + 5$	$1 + 1 + 12$
$1 + 11 + 2$	$10 + 1 + 3$	$4 + 1 + 9$	$1 + 8 + 5$
$6 + 1 + 7$	$2 + 10 + 2$	$3 + 2 + 9$	$4 + 8 + 2$
$7 + 2 + 5$	$6 + 2 + 6$	$3 + 8 + 3$	$3 + 4 + 7$
$5 + 3 + 6$	$4 + 4 + 6$	$5 + 4 + 5$	$1 + 1 + 13$

Drill as in Exercise XLIV.

XLVI.

Write as in Exercise XLIV.

$2 + 1 + 12$	$1 + 11 + 3$	$4 + 10 + 1$
$9 + 1 + 5$	$6 + 8 + 1$	$7 + 7 + 1$
$2 + 2 + 11$	$3 + 10 + 2$	$4 + 2 + 9$
$8 + 5 + 2$	$6 + 2 + 7$	$3 + 9 + 3$
$4 + 3 + 8$	$7 + 5 + 3$	$6 + 6 + 3$
$4 + 7 + 4$	$6 + 5 + 4$	$5 + 5 + 5$
$14 + 1 + 1$	$2 + 13 + 1$	$1 + 12 + 3$

$4 + 1 + 11$	$1 + 10 + 5$	$8 + 1 + 7$
$9 + 6 + 1$	$2 + 12 + 2$	$11 + 2 + 3$
$10 + 2 + 4$	$2 + 9 + 5$	$8 + 6 + 2$
$7 + 2 + 7$	$3 + 3 + 10$	$9 + 3 + 4$
$8 + 5 + 3$	$6 + 7 + 3$	$4 + 4 + 8$
$7 + 5 + 4$	$6 + 6 + 4$	$5 + 6 + 5$
$1 + 1 + 15$		

Drill as in Exercise XLIV.

XLVII.

Write as in Exercise XLIV.

$1 + 14 + 2$	$3 + 1 + 13$	$12 + 4 + 1$
$1 + 11 + 5$	$6 + 1 + 10$	$9 + 1 + 7$
$8 + 1 + 8$	$2 + 2 + 13$	$2 + 12 + 3$
$11 + 2 + 4$	$10 + 5 + 2$	$2 + 9 + 6$
$7 + 2 + 8$	$3 + 11 + 3$	$3 + 10 + 4$
$5 + 3 + 9$	$8 + 6 + 3$	$7 + 3 + 7$
$4 + 4 + 9$	$4 + 8 + 5$	$4 + 7 + 6$
$5 + 7 + 5$	$5 + 6 + 6$	$1 + 16 + 1$
$2 + 1 + 15$	$14 + 1 + 3$	$1 + 13 + 4$
$5 + 1 + 12$	$11 + 6 + 1$	$7 + 10 + 1$
$1 + 8 + 9$	$2 + 14 + 2$	$2 + 13 + 3$
$4 + 2 + 12$	$5 + 11 + 2$	$10 + 2 + 6$
$7 + 2 + 9$	$8 + 8 + 2$	$3 + 12 + 3$
$4 + 3 + 11$		

Drill as in Exercise XLIV.

XLVIII.

Write as in Exercise XLIV.

$3 + 5 + 10$	$3 + 6 + 9$	$7 + 8 + 3$
$4 + 10 + 4$	$9 + 5 + 4$	$4 + 8 + 6$
$7 + 7 + 4$	$5 + 8 + 5$	$5 + 7 + 6$
$6 + 6 + 6$	$1 + 17 + 1$	$2 + 16 + 1$

15 + 1 + 3	4 + 1 + 14	1 + 13 + 5
12 + 6 + 1	1 + 11 + 7	8 + 1 + 10
9 + 9 + 1	2 + 15 + 2	14 + 2 + 3
2 + 13 + 4	5 + 2 + 12	2 + 11 + 6
7 + 2 + 10	9 + 8 + 2	3 + 13 + 3
3 + 12 + 4	3 + 11 + 5	6 + 3 + 10
3 + 9 + 7	8 + 8 + 3	4 + 4 + 11
10 + 5 + 4	6 + 9 + 4	7 + 4 + 8
5 + 9 + 5	5 + 8 + 6	7 + 5 + 7
6 + 6 + 7		

Drill as in Exercise XLIV.

XLIX.

Write as in Exercise XLIII.

1 + 4 + 3 + 2	4 + 2 + 3 + 1	2 + 4 + 2 + 2
2 + 3 + 3 + 2	1 + 1 + 1 + 7	6 + 2 + 1 + 1
3 + 3 + 1 + 3	2 + 2 + 2 + 5	2 + 2 + 3 + 4
2 + 3 + 3 + 3	3 + 1 + 4 + 3	3 + 3 + 3 + 3
2 + 2 + 2 + 6	4 + 4 + 2 + 2	5 + 2 + 3 + 2
4 + 2 + 3 + 4	1 + 7 + 2 + 3	2 + 2 + 2 + 7
4 + 4 + 1 + 4	3 + 3 + 4 + 3	2 + 3 + 4 + 4
3 + 4 + 1 + 5	4 + 5 + 2 + 2	4 + 4 + 4 + 2
2 + 3 + 4 + 5	5 + 3 + 3 + 3	4 + 3 + 3 + 4
7 + 2 + 3 + 2	2 + 2 + 8 + 2	1 + 6 + 6 + 1
5 + 6 + 2 + 1	5 + 4 + 3 + 3	5 + 3 + 5 + 2

Drill as in Exercise XLIV.

L.

Write as in Exercise XLIV.

4 + 3 + 4 + 4	3 + 6 + 3 + 3	2 + 7 + 2 + 4
3 + 3 + 7 + 2	6 + 2 + 5 + 2	8 + 3 + 1 + 3
2 + 9 + 2 + 2	2 + 10 + 2 + 1	4 + 4 + 4 + 4
3 + 3 + 7 + 3	9 + 2 + 3 + 2	3 + 8 + 3 + 2

$7 + 6 + 2 + 1$	$6 + 2 + 6 + 2$	$3 + 6 + 4 + 3$
$3 + 6 + 3 + 4$	$5 + 1 + 5 + 5$	$5 + 5 + 4 + 2$
$5 + 2 + 2 + 7$	$4 + 4 + 3 + 5$	$2 + 10 + 2 + 2$
$3 + 9 + 2 + 2$	$2 + 3 + 8 + 3$	$2 + 3 + 4 + 8$
$2 + 4 + 5 + 6$	$3 + 4 + 5 + 5$	$5 + 5 + 2 + 5$
$4 + 5 + 5 + 3$	$5 + 4 + 4 + 4$	$3 + 8 + 3 + 3$
$2 + 11 + 2 + 2$	$3 + 3 + 4 + 7$	$3 + 4 + 2 + 8$
$7 + 2 + 4 + 4$	$4 + 4 + 6 + 3$	$3 + 3 + 3 + 9$

Drill as in Exercise XLIV.

LI.

Write as in Exercise XLIV.

$2 + 2 + 12 + 2$	$2 + 4 + 9 + 3$	$3 + 4 + 8 + 3$
$7 + 7 + 2 + 2$	$5 + 3 + 5 + 5$	$6 + 3 + 6 + 3$
$4 + 5 + 7 + 2$	$3 + 5 + 6 + 4$	$2 + 7 + 4 + 5$
$4 + 4 + 7 + 3$	$3 + 4 + 8 + 3$	$4 + 4 + 7 + 4$
$3 + 10 + 3 + 3$	$2 + 13 + 2 + 2$	$3 + 4 + 5 + 7$
$5 + 4 + 5 + 5$	$1 + 6 + 6 + 6$	$2 + 7 + 3 + 7$
$8 + 7 + 2 + 2$	$6 + 2 + 3 + 8$	$3 + 6 + 6 + 4$
$1 + 8 + 8 + 2$	$4 + 4 + 5 + 6$	$3 + 3 + 7 + 6$
$2 + 2 + 13 + 2$	$3 + 4 + 5 + 7$	$4 + 5 + 2 + 8$
$1 + 6 + 8 + 4$	$6 + 2 + 6 + 5$	$5 + 7 + 2 + 5$

Drill as in Exercise XLIV.

LII.

Mental.

One boy has 3 marbles, another 10, another 5 : how many have all together? If one has 5, another 7, another 7? * If one has 4, another 7, another 6? If one has 5, another 11, another 2? If one has 9, another 6, another 1? If one has 5, another 4, another 9? If one has 4, another 4,

* In all cases, let skeleton questions be filled up.

another 8? If one has 7, another 9, another 3? If one has 4, another 3, another 8? If one has 7, another 6, another 4? If one has 5, another 4, another 7?

One girl has 5 apples, another 4, another 7: how many have they all together? If one has 6, another 3, another 9? If one has 5, another 3, another 7? If one has 8, another 6, another 4? If one has 4, another 4, another 9? If one has 7, another 6, another 5? If one has 3, another 6, another 9? If one has 5, another 7, another 4? If one has 6, another 8, another 5? If one has 8, another 7, another 3? If one has 5, another 3, another 9? If one has 1, another 7, another 6? If one has 4, another 7, another 6?

Reproduce.

LIII.

Count backward, 19 to 1.

Write the following groups of numbers, with amounts or differences, as the case may be.

FORM:	$8 + 1 = 9$	$6 + 2 = 8$
	$8 - 1 = 7$	$6 - 2 = 4$

How many are 9 and 1? 10 and 1? 11 and 1? 12 and 1? 13 and 1? 14 and 1? 15 and 1? 16 and 1? 17 and 1? 18 and 1?

What is the difference between 19 and 1? between 18 and 1? between 17 and 1? between 16 and 1? between 15 and 1? between 14 and 1? between 13 and 1? between 12 and 1? between 11 and 1? between 10 and 1?

How many are 8 and 2? 10 and 2? 12 and 2? 14 and 2? 16 and 2? 9 and 2? 11 and 2? 13 and 2? 15 and 2? 17 and 2?

What is the difference between 19 and 2? between 17 and 2? between 15 and 2? between 13 and 2? between 11 and 2?

2? between 18 and 2? between 16 and 2? between 14 and 2? between 12 and 2? between 10 and 2?

DRILL: Read, first, nine plus one equals ten, &c.; nineteen minus one equals eighteen, &c.; then the sums and differences being erased, let these be stated at sight; then a *mémoriter* drill, and the reproduction.

LIV.

Write as in Exercise LIII.

How many are 7 and 3? 10 and 3? 13 and 3? 16 and 3? 8 and 3? 11 and 3? 14 and 3? 9 and 3? 12 and 3? 15 and 3?

What is the difference between 19 and 3? between 16 and 3? between 13 and 3? between 10 and 3? between 18 and 3? between 15 and 3? between 12 and 3? between 17 and 3? between 14 and 3? between 11 and 3?

How many are 6 and 4? 10 and 4? 14 and 4? 7 and 4? 11 and 4? 15 and 4? 8 and 4? 12 and 4? 9 and 4? 13 and 4?

What is the difference between 19 and 4? between 15 and 4? between 11 and 4? between 18 and 4? between 14 and 4? between 10 and 4? between 17 and 4? between 13 and 4? between 16 and 4? between 12 and 4?

Drill as in Exercise LIII.

LV.

Count backward by twos, 19 to 1, 18 to 2.

Write as in Exercise LIII.

How many are 5 and 5? 10 and 5? 6 and 5? 11 and 5? 7 and 5? 12 and 5? 8 and 5? 13 and 5? 9 and 5? 14 and 5?

What is the difference between 19 and 5? between 14 and 5? between 18 and 5? between 13 and 5? between 17

and 5? between 12 and 5? between 16 and 5? between 11 and 5? between 15 and 5? between 10 and 5?

How many are 4 and 6? 10 and 6? 5 and 6? 11 and 6? 6 and 6? 12 and 6? 7 and 6? 13 and 6? 8 and 6? 9 and 6?

What is the difference between 19 and 6? between 13 and 6? between 18 and 6? between 12 and 6? between 17 and 6? between 11 and 6? between 16 and 6? between 10 and 6? between 15 and 6? between 14 and 6?

Drill as in Exercise LIII.

LVI.

Count backward by threes, 19 to 1, 18 to 3, 17 to 2.

Write as in Exercise LIII.

How many are 3 and 7? 10 and 7? 4 and 7? 11 and 7? 5 and 7? 12 and 7? 6 and 7? 7 and 7? 8 and 7? 9 and 7?

What is the difference between 19 and 7? between 12 and 7? between 18 and 7? between 11 and 7? between 17 and 7? between 10 and 7? between 16 and 7? between 15 and 7? between 14 and 7? between 13 and 7?

How many are 2 and 8? 10 and 8? 3 and 8? 11 and 8? 4 and 8? 5 and 8? 6 and 8? 7 and 8? 8 and 8? 9 and 8?

What is the difference between 19 and 8? between 11 and 8? between 18 and 8? between 10 and 8? between 17 and 8? between 16 and 8? between 15 and 8? between 14 and 8? between 13 and 8? between 12 and 8?

How many are 1 and 9? 10 and 9? 2 and 9? 3 and 9? 4 and 9? 5 and 9? 6 and 9? 7 and 9? 8 and 9? 9 and 9?

What is the difference between 19 and 9? between 10 and 9? between 18 and 9? between 17 and 9? between 16 and 9? between 15 and 9? between 14 and 9? between 13 and 9? between 12 and 9? between 11 and 9?

Drill as in Exercise LIII.

LVII.

Write according to forms previously set forth :

Add 4 and 15; 4 and 13; 4 and 11; 4 and 9; 4 and 7; 4 and 4; 4 and 12; 4 and 10; 4 and 8; 4 and 6; 7 and 12; 7 and 10; 7 and 8; 7 and 6; 7 and 4; 7 and 11; 7 and 9; 7 and 7; 7 and 5; 7 and 3.

Take 4 from 19: how many remain? 4 from 17? 4 from 15? 4 from 13? 4 from 11? 4 from 18? 4 from 16? 4 from 14? 4 from 12? 4 from 10? 7 from 19? 7 from 17? 7 from 15? 7 from 13? 7 from 11? 7 from 18? 7 from 16? 7 from 14? 7 from 12? 7 from 10?

Drill as in Exercise LIII.

LVIII.

Write according to forms previously set forth :

Add 9 and 10; 9 and 8; 9 and 6; 9 and 4; 9 and 2; 9 and 9; 9 and 7; 9 and 5; 9 and 3; 9 and 1; 6 and 13; 6 and 11; 6 and 9; 6 and 7; 6 and 5; 6 and 12; 6 and 10; 6 and 8; 6 and 6; 6 and 4.

Take 9 from 19: how many remain? 9 from 17? 9 from 15? 9 from 13? 9 from 11? 9 from 18? 9 from 16? 9 from 14? 9 from 12? 9 from 10? 6 from 19? 6 from 17? 6 from 15? 6 from 13? 6 from 11? 6 from 18? 6 from 16? 6 from 14? 6 from 12? 6 from 10?

Drill as in Exercise LIII.

LIX.

Write according to forms previously set forth :

Add 5 and 14; 5 and 12; 5 and 10; 5 and 8; 5 and 6; 5 and 13; 5 and 11; 5 and 9; 5 and 7; 5 and 5; 8 and 11; 8 and 9; 8 and 7; 8 and 5; 8 and 3; 8 and 10; 8 and 8; 8 and 6; 8 and 4; 8 and 2.

Take 5 from 19: how many remain? 5 from 17? 5 from 15? 5 from 13? 5 from 11? 5 from 18? 5 from 16? 5 from 14? 5 from 12? 5 from 10? 8 from 19? 8 from 17? 8 from 15? 8 from 13? 8 from 11? 8 from 18? 8 from 16? 8 from 14? 8 from 12? 8 from 10?

Drill as in Exercise LIII.

LX.

Write according to forms previously set forth:

Add 1 and 18; 1 and 16; 1 and 14; 1 and 12; 1 and 10; 1 and 17; 1 and 15; 1 and 13; 1 and 11; 1 and 9; 3 and 16; 3 and 14; 3 and 12; 3 and 10; 3 and 8; 3 and 15; 3 and 13; 3 and 11; 3 and 9; 3 and 7; 2 and 17; 2 and 15; 2 and 13; 2 and 11; 2 and 9; 2 and 16; 2 and 14; 2 and 12; 2 and 10; 2 and 8.

Take 1 from 19: how many remain? 1 from 17? 1 from 15? 1 from 13? 1 from 11? 1 from 18? 1 from 16? 1 from 14? 1 from 12? 1 from 10? 3 from 19? 3 from 17? 3 from 15? 3 from 13? 3 from 11? 3 from 18? 3 from 16? 3 from 14? 3 from 12? 3 from 10? 2 from 19? 2 from 17? 2 from 15? 2 from 13? 2 from 11? 2 from 18? 2 from 16? 2 from 14? 2 from 12? 2 from 10?

Drill as in Exercise LIII.

LXI.

Write the following subtractions, the smaller number underneath the larger, and below them a straight line, with the remainder under that.

FORM:	12	6	10		
	3	3	2		
	—	—	—		
	9	3	8		
17 — 9	15 — 6	13 — 4	9 — 8	19 — 3	
10 — 7	16 — 5	14 — 8	17 — 8	18 — 9	

12 — 6	11 — 4	19 — 10	17 — 13	15 — 9
13 — 5	19 — 7	10 — 2	16 — 8	14 — 5
17 — 12	18 — 12	12 — 7	11 — 3	19 — 18
17 — 7	15 — 7	13 — 9	10 — 6	16 — 9
14 — 9	12 — 9	11 — 9	18 — 7	19 — 4
17 — 5	15 — 8	13 — 7	10 — 4	

DRILL: Read, first, seventeen minus nine equals eight, &c.; then, nine from seventeen leaves eight, &c.; then adding remainders to the subtracted number show how the sum equals the other given number, thus 8 and 9 are 17, &c.; then erasing differences, let these be stated at sight; then a *memoriter* drill, and the reproduction.

LXII.

Write as in Exercise LXI.

16 — 7	14 — 10	12 — 8	11 — 2	18 — 8
15 — 10	13 — 2	10 — 3	16 — 6	14 — 3
12 — 5	11 — 10	18 — 5	15 — 5	18 — 6
10 — 5	16 — 10	14 — 4	12 — 4	11 — 5
18 — 6	19 — 5	17 — 6	15 — 4	13 — 3
10 — 8	16 — 4	14 — 6	12 — 10	11 — 8
18 — 10	19 — 17	17 — 4	15 — 3	13 — 8
10 — 1	16 — 11	14 — 11	12 — 3	11 — 6
18 — 4	19 — 6			

Drill as in Exercise LXI.

LXIII.

Write as in Exercise LXI.

17 — 10	15 — 11	13 — 10	10 — 9	16 — 8
14 — 2	12 — 11	11 — 7	18 — 11	19 — 16
17 — 3	15 — 12	13 — 1	16 — 12	14 — 7
12 — 1	11 — 1	18 — 17	19 — 9	17 — 16
15 — 2	13 — 12	16 — 2	14 — 12	12 — 2
18 — 13	19 — 12	17 — 11	15 — 14	13 — 11
16 — 15	14 — 1	18 — 1	19 — 15	17 — 2
15 — 1	16 — 14	14 — 13	18 — 16	19 — 2

$17 - 15$ $15 - 13$ $16 - 1$ $18 - 15$ $19 - 14$
 $17 - 1$ $16 - 13$ $18 - 2$ $19 - 1$ $17 - 14$
 $18 - 14$ $19 - 8$ $18 - 3$ $19 - 11$ $19 - 13$

Drill as in Exercise LXI.

LXIV.

Write the following groups of numbers, with results.

FORM: $1 + 4 - 2 = 3$
 $6 - 4 + 3 = 5$
 $9 - 7 + 4 = 6$
 $1 + 1 - 2 = 0$

$9 + 9 - 7$	$2 + 6 - 8$	$19 - 4 + 3$
$8 + 7 + 2$	$15 - 7 + 8$	$14 + 5 - 17$
$3 + 9 - 6$	$7 + 9 - 4$	$18 - 7 + 5$
$16 - 8 + 7$	$5 + 8 + 6$	$17 - 5 - 6$
$9 + 7 - 16$	$14 - 5 + 6$	$3 + 15 - 12$
$7 + 7 - 6$	$13 + 6 - 1$	$12 - 5 + 6$
$4 + 14 - 2$	$15 - 3 + 7$	$6 + 11 - 13$
$19 - 8 + 7$	$8 + 11 - 4$	$10 + 7 - 13$
$16 - 5 + 4$	$4 + 13 - 11$	$7 - 4 + 16$
$13 + 3 - 2$	$3 + 12 - 8$	$13 - 2 + 6$
$3 + 14 - 2$	$16 - 11 + 10$	$9 + 5 - 10$
$18 - 4 - 3$	$1 + 17 - 5$	$12 - 8 + 13$
$10 - 7 + 15$	$4 + 12 - 7$	$15 - 4 + 3$
$17 - 12 + 10$	$14 + 3 - 12$	$9 + 8 - 11$
$8 + 8 - 9$	$7 + 8 + 3$	$6 + 6 - 5$
$19 - 7 - 5$		

DRILL: Read, first, nine plus nine minus seven equals eleven, &c.; then, erasing results, let these be stated at sight; then, a *memoriter* drill, and the reproduction.

LXV.

Mental.

A teacher has 19 slates: if she gives out 7, how many will she have left? If she gives out 5 more, how many will then remain? If she gives out 3 more? If she gives out 4

more? If, having 19, she gives out, first, 7, then 5, then 3, then 4, how many will she have given out in all?

Another has 18 apples: if she gives one child 3, how many will remain? If she gives 5 out of the 18, how many will remain? If she gives 7 out of the 18? If she gives 9? If 10? If 4? If 15? If 1? If 14? If 2? If 6? If 8? If 11? If 16? If 12? If 17? If 13?

A man buys 17 peaches, and gives away 3: how many will remain? Then 3 of what is left: how many remain? Then 3? Then 3? Then 3? Then 2?

There are 16 books: to one class 4 are given: how many remain? To another 5: how many remain? To another 3? To another 3? To another 1?

Reproduce.

LXVI.

Write the following additions and multiplications.

$$\begin{array}{ll} \text{Form:} & 2 \times 1 = 2 \qquad 3 \times 1 = 3 \\ & 2 + 1 = 3 \qquad 3 + 1 = 4 \end{array}$$

Add 2 and 2; 2, and 2, and 2; 2, and 2, and 2, and 2; 2, and 2, and 2, and 2, and 2; six twos; seven twos; eight twos; nine twos.

Multiply 2 by 2; 2 by 3; 2 by 4; 2 by 5; 2 by 6; 2 by 7; 2 by 8; 2 by 9.

Add 3 and 3; 3 threes; 4 threes; 5 threes; 6 threes.

Multiply 3 by 2; 3 by 3; 3 by 4; 3 by 5; 3 by 6.

Add 4 and 4; three fours; four fours.

Multiply 4 by 2; 4 by 3; 4 by 4.

Add 5 and 5; 5, and 5, and 5.

Multiply 5 by 2; 5 by 3.

Add 6 and 6; 6, and 6, and 6; 7 and 7; 8 and 8; 9 and 9.

Multiply 6 by 2; 6 by 3; 7 by 2; 8 by 2; 9 by 2.

DRILL: Read the multiplications, first, 2 multiplied by 2 equals 4, &c.; then twice 2 are 4, &c.; then 2 twos are 4, &c.; the additions as in former exercises. Then, erasing results, let these be stated at sight. Then a *memoriter* drill, and the reproduction.

LXVII.

Write as in Exercise LXVI.

10 Ones are how many? 2 Twos? 3 Threes? 2 Fours?
 11 Ones? 6 Ones? 2 Nines? 3 Ones? 12 Ones? 2 Eights?
 4 Fours? 5 Ones? 3 Twos? 9 Ones? 5 Twos? 2 Sevens; 4
 Ones? 3 Fours? 2 Ones? 3 Fives? 8 Ones? 4 Twos? 7
 Ones? 6 Twos? 2 Sixes? 9 Twos? 2 Threes? 7 Twos? 4
 Threes? 8 Twos? 5 Threes? 2 Fives? 6 Threes?

4×2	4×4	7×2	2×4	2×9	3×4
5×2	3×3	8×2	2×5	5×3	6×2
6×3	2×7	3×5	2×2	9×2	2×3
4×3	2×6	3×2	2×8	3×6	

Drill as in Exercise LXVI.

LXVIII.

Write the following divisions:

$$\begin{array}{l} \text{FORM:} \quad 4 \div 2 = 2 \\ \quad \quad \quad 8 \div 8 = 1 \\ \quad \quad \quad 6 \div 1 = 6 \end{array}$$

How many times is 1 contained in 19? in 17? in 15? in
 13? in 11? in 9? in 7? in 5? in 3? in 1? in 18? in 16?
 in 14? in 12? in 10? in 8? in 6? in 4? in 2?

How many times is 2 contained in 18? in 16? in 14? in
 12? in 10? in 8? in 6? in 4?

How many times is 3 contained in 18? in 15? in 12? in
 9? in 6?

How many times is 4 contained in 16? in 12? in 8? 5 in
 15? 5 in 10? 6 in 18? 6 in 12? 7 in 14? 8 in 16? 9 in 18?

DRILL: Read, first, 19 divided by 1 equals 19, &c.; then, 1 in 19, 19
 times, &c.; then, multiply the quotient by the divisor, and show that this
 produces the dividend; then, erasing results, let these be stated at sight; then
 a *memoriter* drill, and the reproduction.

LXIX.

Write the following divisions, the dividend above the divisor, and a line drawn between them.

FORM: $\frac{4}{2} = 2.$

$\frac{8}{8} = 1.$

$\frac{6}{1} = 6.$

Divide 18 by 9; 18 by 6; 18 by 3; 18 by 2; 16 by 4; 16 by 8; 16 by 2; 15 by 3; 15 by 5; 14 by 7; 14 by 2; 12 by 6; 12 by 4; 12 by 3; 12 by 2; 10 by 5; 10 by 2; 9 by 3; 8 by 4; 8 by 2; 6 by 3; 6 by 2; 4 by 2.

$8 \div 4$	$16 \div 4$	$14 \div 2$	$8 \div 2$	$18 \div 9$
$12 \div 4$	$10 \div 2$	$9 \div 3$	$16 \div 8$	$10 \div 5$
$15 \div 3$	$12 \div 6$	$18 \div 3$	$14 \div 7$	$15 \div 5$
$4 \div 2$	$18 \div 2$	$6 \div 3$	$12 \div 3$	$12 \div 2$
$6 \div 2$	$16 \div 2$	$18 \div 6$		

Drill as in Exercise LXVIII.

LXX.

Write the following groups, with results, according to the forms already prescribed.

$18 - 2$	$18 \div 2$	$18 - 3$	$18 \div 3$	$18 - 4$
$19 - 3$	$18 - 5$	$19 - 4$	$18 - 6$	$18 \div 6$
$19 - 5$	$18 - 7$	$19 - 6$	$18 - 8$	$19 - 7$
$17 - 3$	$19 - 8$	$18 - 7$	$17 - 4$	$16 - 2$
$16 \div 2$	$16 + 2$	$19 - 9$	$18 - 8$	$17 - 5$
$16 + 3$	$16 - 3$	$19 - 10$	$18 - 9$	$18 \div 9$
$17 - 6$	$16 - 4$	$16 \div 4$	$18 - 10$	$17 - 7$
$16 - 5$	$15 + 3$	$15 - 3$	$15 \div 3$	$14 + 2$
$14 - 2$	$14 \div 2$	$18 - 9$	$18 \div 9$	$17 - 8$
$16 - 6$	$15 + 4$	$15 - 4$	$14 + 3$	$14 - 3$
$18 \div 6$	$18 \div 3$	$16 - 7$	$15 - 5$	$15 \div 5$
$14 + 4$	$14 - 4$	$13 + 3$	$13 - 3$	$16 - 4$
$16 \div 4$				

Drill as in previous exercises.

LXXI.

Write as in Exercise LXX.

15—6	14+5	14—5	13+4	13—4
15—7	14—6	13+5	13—5	12+2
12—2	12÷2	14—7	14÷7	13+6
13—6	12+3	12—3	12÷3	12+7
12—7	10+2	10—2	10÷2	12+4
12—4	12÷4	11+3	11—3	10+3
10—3	9+3	9—3	9÷3	12+6
12—6	12÷6	10+5	10—5	10÷5
9+6	9—6	8+2	8—2	8×2
8÷2	6+3	6—3	6×3	6÷3
6+2	6—2	6×2	6÷2	5+2
5—2	5×2	7+2	7—2	7×2
4+4	4×4	5+3	5—3	5×3
7+2	7—2	7×2	9×2	9—2

Drill as in previous exercises.

LXXII.

Mental.

A man desires to give 4 boys 4 oranges each: how many must he have? If he gives 6 boys 3 oranges each, how many? If 3 boys 4 oranges each? If 2 boys 6 oranges each? If 7 boys 2 oranges each? If 5 boys 3 oranges each? If 4 boys 3 oranges each? If 2 boys 2 oranges each? If 3 boys 3 oranges each? If 2 boys 9 oranges each? If 3 boys 2 oranges each? If 2 boys 8 oranges each? If 4 boys 2 oranges each? If 2 boys 7 oranges each? If 5 boys 2 oranges each? If 2 boys 3 oranges each? If 6 boys 2 oranges each? If 2 boys 5 oranges each? If 3 boys 6 oranges each? If 8 boys 2 oranges each? If 2 boys 4 oranges each? If 3 boys 5 oranges each? If 9 boys 2 oranges each?

Reproduce.

LXXIII.

Mental.

Having 18 chestnuts, we would distribute them equally between 2 boys: how many would each have? If distributed equally among 3 boys? Among 6 boys? Among 9 boys?

A teacher had a class of 16 girls, and would make 2 sections: how many would there be in each section? If 4 sections, how many in each? If 8 sections?

With 14 peaches, how many would each have, if divided equally among 7 children? Between 2?

15 flowers are to be divided equally among 3 persons: how many would each receive? Among 5 persons?

If you have 12 berries, and would divide them into 2 equal lots, how many would there be in each lot? Into 3 equal lots? Into 4? Into 6?

James, William, and Ellen own, together, 9 chickens, and each owns an equal number: how many does each own?

Reproduce.

CHAPTER THE THIRD.

Twenty to Twenty-nine.

LXXIV.

19. $19 = 10 + 9$. $19 + 1 = 10 + (9 + 1) = 10 + 10 = 2$ Tens. 2 in the right-hand place stands for 2 Ones; in the second place it stands for 2 Tens: thus: 20. We read 2 Tens, *Twenty*. $20 + 1$, we write 21: the 1 is *One*, the 2 is *Twenty*. We represent twenty in letters by two X's = 2 tens: XX. Numbers to twenty-nine by adding to XX the necessary letters for the numbers over, as in the following table.

Write the following table upon the blackboard :

Twenty = 2 Tens + Nothing,	XX	20
Twenty-one = 2 Tens + One,	XXI	21
Twenty-two = 2 Tens + Two,	XXII	22
Twenty-three = 2 Tens + Three,	XXIII	23
Twenty-four = 2 Tens + Four,	XXIV	24
Twenty-five = 2 Tens + Five,	XXV	25
Twenty-six = 2 Tens + Six,	XXVI	26
Twenty-seven = 2 Tens + Seven,	XXVII	27
Twenty-eight = 2 Tens + Eight,	XXVIII	28
Twenty-nine = 2 Tens + Nine,	XXIX	29

Drill as in Exercise XXXVI. "Why do you read the 2 as twenty?" "Because it is in the second place—the place of tens. 2 tens = 20." What does 1 mean in the first place? In the second place? 2 in the first place? 2 in the second?

LXXV.

Read the following numbers :

0; 7; 19; 23; 10; 5; 3; 20; 1; 18; 16; 27; 2; 4; 17; 21; 6; 15; 29; 14; 8; 22; 11; 13; 9; 25; 12; 19; 18; 24; 17; 16; 28; 12; 11; 26; 10; 15; 23; 14; 13; 20; 9; 8; 27; 7; 6; 21; 3; 2; 29; 1; 5; 22; 4; 0; 25; 24; 28; 26. VI, XVI, XX, XXIX, XXII, XXVIII, XIX, XXI, XIV, VII, XXIII, X, V, III, I, XVIII, XVII, XXVII, II, IV, XV, VIII, XI, XIII, IX, XXV, XII, XXIV, XXVI.

Drill as in Exercise XXXVII., and see Exercise LXXIV.

LXXVI.

Write the following numbers, in figures and letters :

Nine	Nineteen	Twenty-nine	Eight
Eighteen	Twenty-eight	Seven	Seventeen
Twenty-seven	Six	Sixteen	Twenty-six
Five	Fifteen	Twenty-five	Four

Fourteen	Twenty-four	Three	Thirteen
Twenty-three	Two	Twelve	Twenty-two
One	Eleven	Twenty-one	Nothing
Ten	Twenty.		

Continue the exercise, until each pupil writes neatly and promptly every number up to 29. Read and analyze.

LXXVII.

Count from 1 to 29.

Write the following additions:

FORM: $1 + 3 = 4$
 $7 + 2 = 9$
 $4 + 4 = 8.$

19 and 1 are how many? * 20 and 1? 21 and 1? 22 and 1? 23 and 1? 24 and 1? 25 and 1? 26 and 1? 27 and 1? 28 and 1? 18 and 2? 20 and 2? 22 and 2? 24 and 2? 26 and 2? 19 and 2? 21 and 2? 23 and 2? 25 and 2? 27 and 2? 17 and 3? 20 and 3? 23 and 3? 26 and 3? 18 and 3? 21 and 3? 24 and 3? 19 and 3? 22 and 3? 25 and 3?

DRILL: Read, first, 19 plus 1 equals 20, &c.; then 19 and 1 are 20, &c.; then let the numbers occupying two places be analyzed; then erasing amounts, let them be named at sight; then a *memoriter* drill, and the reproduction.

LXXVIII.

Count by twos from 1 to 29, and 2 to 28.

Write the following additions, as in Exercise LXXVII.

16 and 4 are how many? 20 and 4? 24 and 4? 17 and 4? 21 and 4? 25 and 4? 18 and 4? 22 and 4? 19 and 4? 23 and 4? 15 and 5? 20 and 5? 16 and 5? 21 and 5? 17 and 5? 22 and 5? 18 and 5? 23 and 5? 19 and

* When needful, let the additions be verified by marks upon the board. The tens, in such cases, may be written by themselves to the left.

5? 24 and 5? 14 and 6? 20 and 6? 15 and 6? 21 and
6? 16 and 6? 22 and 6? 17 and 6? 23 and 6? 18 and
6? 19 and 6?

Drill as in Exercise LXXVII.

LXXIX.

Count by threes from 1 to 28, 2 to 29, 3 to 27.

Write the following additions, as in Exercise LXXVII.

13 and 7 are how many? 20 and 7? 14 and 7? 21 and
7? 15 and 7? 22 and 7? 16 and 7? 17 and 7? 18 and 7?
19 and 7? 12 and 8? 20 and 8? 13 and 8? 21 and 8? 14
and 8? 15 and 8? 16 and 8? 17 and 8? 18 and 8? 19 and
8? 11 and 9? 20 and 9? 12 and 9? 13 and 9? 14 and 9?
15 and 9? 16 and 9? 17 and 9? 18 and 9? 19 and 9?

Drill as in Exercise LXXVII.

LXXX.

Count by fours from 1 to 29, 2 to 26, 3 to 27, 4 to 28.

Write as in Exercise LXXVII.

2 + 2	12 + 2	22 + 2	2 + 3	12 + 3
22 + 3	2 + 4	12 + 4	22 + 4	2 + 5
12 + 5	22 + 5	2 + 6	12 + 6	22 + 6
2 + 7	12 + 7	22 + 7	3 + 2	13 + 2
23 + 2	3 + 3	13 + 3	23 + 3	3 + 4
13 + 4	23 + 4	3 + 5	13 + 5	23 + 5
3 + 6	13 + 6	23 + 6	4 + 2	14 + 2
24 + 2	4 + 3	14 + 3	24 + 3	4 + 4
14 + 4	24 + 4	4 + 5	14 + 5	24 + 5

Drill as in Exercise LXXVII.

LXXXI.

Count by fives from 1 to 26, 2 to 27, 3 to 28, 4 to 29, 5
to 25.

Write as in Exercise LXXVII.

5 + 2	15 + 2	25 + 2	5 + 3	15 + 3
25 + 3	5 + 4	15 + 4	25 + 4	6 + 2

16 + 2	26 + 2	6 + 3	16 + 3	26 + 3
7 + 2	17 + 2	27 + 2	1 + 2	11 + 2
21 + 2	1 + 3	11 + 3	21 + 3	1 + 4
11 + 4	21 + 4	1 + 5	11 + 5	21 + 5
1 + 6	11 + 6	21 + 6	1 + 7	11 + 7
21 + 7	1 + 8	11 + 8	21 + 8	2 + 8
12 + 8	1 + 9	11 + 9	2 + 9	12 + 9
3 + 7	13 + 7	3 + 8	13 + 8	3 + 9
13 + 9	4 + 6	14 + 6	4 + 7	14 + 7
4 + 8	14 + 8	4 + 9	14 + 9	5 + 5
15 + 5	5 + 6	15 + 6	5 + 7	15 + 7
5 + 8	15 + 8	5 + 9	15 + 9	16 + 3

Drill as in Exercise LXXVII.

LXXXII.

Write as in Exercise LXXVII.

6 + 4	16 + 4	6 + 5	16 + 5	6 + 6
16 + 6	6 + 7	16 + 7	6 + 8	16 + 8
6 + 9	16 + 9	7 + 3	17 + 3	7 + 4
17 + 4	7 + 5	17 + 5	7 + 6	17 + 6
7 + 7	17 + 7	7 + 8	17 + 8	7 + 9
17 + 9	8 + 2	18 + 2	8 + 3	18 + 3
8 + 4	18 + 4	8 + 5	18 + 5	8 + 6
18 + 6	8 + 7	18 + 7	8 + 8	18 + 8
8 + 9	18 + 9	9 + 1	19 + 1	9 + 2
19 + 2	9 + 3	19 + 3	9 + 4	19 + 4
9 + 5	19 + 5	9 + 6	19 + 6	9 + 7
19 + 7	9 + 8	19 + 8	9 + 9	19 + 9

Drill as in Exercise LXXVII.

LXXXIII.

20. It is usual, when we are to add several numbers filling two or more places, to write them one under the other, as has been required in several exercises, and to add by columns.

In this case, we write the amount underneath each column as ascertained. *Add first the right-hand column, which is here composed of ones, or units; afterward the next column to the left, here composed of tens; then the columns further to the left, if any.*

Write the following numbers, one underneath the other, in neat columns, each figure in its proper column; a line beneath the whole, and below that the amount.

•	FORM :	1	2	6
		2	4	12
		<u>3</u>	<u>6</u>	<u>2</u>
		6	12	20

12 + 13	2 + 13 + 14	4 + 15 + 10
16 + 11 + 2	3 + 14 + 12	11 + 7 + 10
12 + 4 + 12	17 + 10 + 2	18 + 1 + 10
12 + 4 + 11	13 + 3 + 13	14 + 3 + 12
15 + 2 + 10	13 + 16	14 + 14
12 + 10	11 + 17	11 + 1 + 17
16 + 1 + 11	12 + 3 + 14	13 + 13 + 1
12 + 5 + 11	11 + 1 + 11	1 + 13 + 15
12 + 2 + 11	3 + 11 + 13	4 + 12 + 1
6 + 11 + 12	11 + 14 + 1	12 + 1 + 11
12 + 12 + 4	2 + 15 + 11	12 + 4 + 13
2 + 14 + 12	12 + 2 + 15	2 + 13 + 12
11 + 16 + 2	12 + 2 + 12	2 + 13 + 13
2 + 16 + 11	12 + 2 + 15	12 + 5 + 12
1 + 17 + 11	12 + 15 + 2	5 + 11 + 11
14 + 3 + 12	13 + 2 + 14	

DRILL: Read, first, downward, 2 units and 3 units are 5 units, 1 ten and 1 ten are 2 tens, &c.; then upward; then, 2 and 3 are 5, in the units place, and 1 and 1 are 2 in the tens place, &c.; then, 12 and 13 are 25, &c.; then, analyze the numbers occupying two places; then, erasing results, let these be stated at sight; then a *memoriter* drill, and the reproduction.

LXXXIV.

21. 10 Ones = 1 Ten. As we have seen, when 1 is written in the second place, it represents 10 times its value in the right-hand place. This is true of every figure. 2 in the second place represents 10 Twos = 2 Tens. $15 = 1 \text{ Ten} + 5 \text{ Ones}$; $25 = 2 \text{ Tens} + 5 \text{ Ones}$. We shall find, by and by, that $35 = 3 \text{ Tens} + 5 \text{ Ones}$; $45 = 4 \text{ Tens} + 5 \text{ Ones}$. Remembering this principle, *if, in addition, the sum of any column is more than 9, the units figure belongs to that column; the tens figure to the next column to the left, with which it must be added.*

$$\begin{array}{r} \text{Thus :} \quad 5 \\ \quad \quad 6 \\ \quad \quad \underline{17} \\ \quad \quad 28 \end{array}$$

Adding the column of units, $7 + 6 + 5 = 18$: the 8, being units, I write in the units place; the 1, being ten, I add to the 1 ten in 17, making 2 tens, as I accordingly write in the tens place of the sum.

Write the following numbers, according to the forms of the preceding exercise :

13 + 4 + 5	4 + 15 + 6	5 + 6 + 17
11 + 3 + 14	12 + 4 + 5	3 + 15 + 6
4 + 16 + 7	5 + 17 + 7	11 + 4 + 5
2 + 15 + 6	13 + 6 + 7	4 + 17 + 8
11 + 5 + 6	2 + 6 + 17	3 + 7 + 18
14 + 8 + 7	1 + 16 + 7	12 + 7 + 8
3 + 18 + 8	11 + 7 + 8	2 + 19 + 8
7 + 16 + 6	17 + 7 + 4	13 + 2 + 13
7 + 15 + 4	8 + 7 + 11	18 + 6 + 3
8 + 15 + 6	3 + 16 + 1	12 + 6 + 5
14 + 4 + 2	6 + 11 + 3	9 + 8 + 12
8 + 11 + 4	6 + 13 + 3	2 + 17 + 9
9 + 14 + 2	18 + 8 + 2	5 + 11 + 4
17 + 1 + 11	2 + 15 + 12	2 + 12 + 8

$$11 + 4 + 3 + 2$$

$$5 + 12 + 3 + 2$$

$$4 + 14 + 4 + 2$$

$$4 + 14 + 4 + 4$$

$$1 + 18 + 8 + 2$$

$$2 + 12 + 5 + 2$$

$$2 + 17 + 2 + 2$$

$$5 + 4 + 13 + 2$$

$$4 + 4 + 16 + 4$$

$$6 + 7 + 11 + 3$$

Drill as in Exercise LXXXIII.

LXXXV.

Mental.

Three boys went a-fishing: one caught 9 fish, another 13, and the other 7; how many did they catch, all together? If one caught 11, another 6, and the other 12? If one 15, another 8, the other 5? If 4, and 9, and 15? If 8, and 7, and 9? If 12, and 5, and 9? If 9, and 6, and 9? If 8, and 8, and 9? If 12, and 9, and 7? If 12, and 7, and 8? If 14, and 9, and 5? If 8, and 9, and 9? If 11, and 8, and 5?

A number of lemons were found on three plates: on one 5, on another 13, on the other 7; how many were there in all? If on one 7, on another 6, on the other 9? If 9, and 7, and 9? If 9, and 9, and 10? If 12, and 8, and 5? If 11, and 8, and 4? If 10, and 8, and 8? If 10, and 7, and 7? If 10, and 9, and 6? If 9, and 6, and 9?

On one shelf are 15 books, on another 9, on another 4: how many are there altogether? If on one 14, on another 7, on another 6? If 13, and 9, and 7? If 12, and 10, and 4? If 11, and 11, and 7? If 10, and 8, and 9? If 9, and 7, and 10? If 8, and 13, and 7? If 7, and 11, and 9? If 6, and 10, and 12? If 5, and 19, and 4? If 4, and 19, and 6? If 3, and 9, and 17?

In one class are 5 scholars, in another, 7, in another 6, in a fourth 8: how many scholars were there in all?

Reproduce.

LXXXVI.

Count backward from 29 to 1.

Write the following groups of numbers, with amounts or differences, as the case may be.

FORM:	$8 + 1 = 9$	$6 + 2 = 8$
	$8 - 7 = 1$	$8 - 2 = 6$

How many are 19 and 1? 20 and 1? 21 and 1? 22 and 1? 23 and 1? 24 and 1? 25 and 1? 26 and 1? 27 and 1? 28 and 1?

What is the difference between 29 and 1? between 28 and 1? between 27 and 1? between 26 and 1? between 25 and 1? between 24 and 1? between 23 and 1? between 22 and 1? between 21 and 1? between 20 and 1?

How many are 18 and 2? 20 and 2? 22 and 2? 24 and 2? 26 and 2? 19 and 2? 21 and 2? 23 and 2? 25 and 2? 27 and 2?

What is the difference between 29 and 2? between 27 and 2? between 25 and 2? between 23 and 2? between 21 and 2? between 28 and 2? between 26 and 2? between 24 and 2? between 22 and 2? between 20 and 2?

DRILL: Read, first, 19 plus 1 equals 20, &c., 29 minus 1 equals 28, &c.; then the sums and differences being erased, let these be stated at sight; then a *memoriter* drill, and the reproduction.

LXXXVII.

Count backward by twos from 29 to 1, 28 to 2.

Write as in Exercise LXXXVI.

How many are 17 and 3? 20 and 3? 23 and 3? 26 and 3? 18 and 3? 21 and 3? 24 and 3? 19 and 3? 22 and 3? 25 and 3?

What is the difference between 29 and 3? between 26 and 3? between 23 and 3? between 20 and 3? between 28

and 3? between 25 and 3? between 22 and 3? between 27 and 3? between 24 and 3? between 21 and 3?

How many are 16 and 4? 20 and 4? 24 and 4? 17 and 4? 21 and 4? 25 and 4? 18 and 4? 22 and 4? 19 and 4? 23 and 4?

What is the difference between 29 and 4? between 25 and 4? between 21 and 4? between 28 and 4? between 24 and 4? between 20 and 4? between 27 and 4? between 23 and 4? between 26 and 4? between 22 and 4?

Drill as in Exercise LXXXVI.

LXXXVIII.

Write as in Exercise LXXXVI.

How many are 15 and 5? 20 and 5? 16 and 5? 21 and 5? 17 and 5? 22 and 5? 18 and 5? 23 and 5? 19 and 5? 24 and 5?

What is the difference between 29 and 5? between 24 and 5? between 28 and 5? between 23 and 5? between 27 and 5? between 22 and 5? between 26 and 5? between 21 and 5? between 25 and 5? between 20 and 5?

How many are 14 and 6? 20 and 6? 15 and 6? 21 and 6? 16 and 6? 22 and 6? 17 and 6? 23 and 6? 18 and 6? 19 and 6?

What is the difference between 29 and 6? between 23 and 6? between 28 and 6? between 22 and 6? between 27 and 6? between 21 and 6? between 26 and 6? between 20 and 6? between 25 and 6? between 24 and 6?

Drill as in Exercise LXXXVI.

LXXXIX.

Write as in Exercise LXXXVI.

How many are 13 and 7? 20 and 7? 14 and 7? 21 and 7? 15 and 7? 22 and 7? 16 and 7? 17 and 7? 18 and 7? 19 and 7?

What is the difference between 29 and 7? between 22 and 7? between 28 and 7? between 21 and 7? between 27 and 7? between 20 and 7? between 26 and 7? between 25 and 7? between 24 and 7? between 23 and 7?

How many are 12 and 8? 20 and 8? 13 and 8? 21 and 8? 14 and 8? 15 and 8? 16 and 8? 17 and 8? 18 and 8? 19 and 8?

What is the difference between 29 and 8? between 21 and 8? between 28 and 8? between 20 and 8? between 27 and 8? between 26 and 8? between 25 and 8? between 24 and 8? between 23 and 8? between 22 and 8?

How many are 11 and 9? 20 and 9? 12 and 9? 13 and 9? 14 and 9? 15 and 9? 16 and 9? 17 and 9? 18 and 9? 19 and 9?

What is the difference between 29 and 9? between 20 and 9? between 28 and 9? between 27 and 9? between 26 and 9? between 25 and 9? between 24 and 9? between 23 and 9? between 22 and 9? between 21 and 9?

Drill as in Exercise LXXXVI.

XC.

Count backward by threes from 29 to 2, 28 to 1, 27 to 3.

Write as in Exercise LXXXVI.

Add 4 and 25; 4 and 23; 4 and 21; 4 and 19; 4 and 17; 4 and 24; 4 and 22; 4 and 20; 4 and 18; 4 and 16; 7 and 22; 7 and 20; 7 and 18; 7 and 16; 7 and 14; 7 and 21; 7 and 19; 7 and 17; 7 and 15; 7 and 13.

Take 4 from 29: how many remain? 4 from 27? 4 from 25? 4 from 23? 4 from 21? 4 from 28? 4 from 26? 4 from 24? 4 from 22? 4 from 20? 7 from 29? 7 from 27? 7 from 25? 7 from 23? 7 from 21? 7 from 28? 7 from 26? 7 from 24? 7 from 22? 7 from 20?

Drill as in Exercise LXXXVI.

XCI.

Write as in Exercise LXXXVI.

Add 9 and 20; 9 and 18; 9 and 16; 9 and 14; 9 and 12; 9 and 19; 9 and 17; 9 and 15; 9 and 13; 9 and 11; 6 and 23; 6 and 21; 6 and 19; 6 and 17; 6 and 15; 6 and 22; 6 and 20; 6 and 18; 6 and 16; 6 and 14.

Take 9 from 29: how many remain? 9 from 27? 9 from 25? 9 from 23? 9 from 21? 9 from 28? 9 from 26? 9 from 24? 9 from 22? 9 from 20? 6 from 29? 6 from 27? 6 from 25? 6 from 23? 6 from 21? 6 from 28? 6 from 26? 6 from 24? 6 from 22? 6 from 20?

Drill as in Exercise LXXXVI.

XCII.

Count backward by fours from 29 to 1, 28 to 4, 27 to 3, 26 to 2.

Write as in Exercise LXXXVI.

Add 5 and 24; 5 and 22; 5 and 20; 5 and 18; 5 and 16; 5 and 23; 5 and 21; 5 and 19; 5 and 17; 5 and 15; 8 and 21; 8 and 19; 8 and 17; 8 and 15; 8 and 13; 8 and 20; 8 and 18; 8 and 16; 8 and 14; 8 and 12.

Take 5 from 29: how many remain? 5 from 27? 5 from 25? 5 from 23? 5 from 21? 5 from 28? 5 from 26? 5 from 24? 5 from 22? 5 from 20? 8 from 29? 8 from 27? 8 from 25? 8 from 23? 8 from 21? 8 from 28? 8 from 26? 8 from 24? 8 from 22? 8 from 20?

Drill as in Exercise LXXXVI.

XCIII.

Count backward by fives from 29 to 4, 28 to 3, 27 to 2, 26 to 1, 25 to 5.

Write as in Exercise LXXXVI.

Add 1 and 28; 1 and 26; 1 and 24; 1 and 22; 1 and

20; 1 and 27; 1 and 25; 1 and 23; 1 and 21; 1 and 19; 3 and 26; 3 and 24; 3 and 22; 3 and 20; 3 and 18; 3 and 25; 3 and 23; 3 and 21; 3 and 19; 3 and 17; 2 and 27; 2 and 25; 2 and 23; 2 and 21; 2 and 19; 2 and 26; 2 and 24; 2 and 22; 2 and 20; 2 and 18.

Take 1 from 29: how many remain? 1 from 27? 1 from 25? 1 from 23? 1 from 21? 1 from 28? 1 from 26? 1 from 24? 1 from 22? 1 from 20? 3 from 29? 3 from 27? 3 from 25? 3 from 23? 3 from 21? 3 from 28? 3 from 26? 3 from 24? 3 from 22? 3 from 20? 2 from 29? 2 from 27? 2 from 25? 2 from 23? 2 from 21? 2 from 28? 2 from 26? 2 from 24? 2 from 22? 2 from 20?

Drill as in Exercise LXXXVI.

XCIV.

22. It is usual, when we are to find the difference between numbers filling two or more places, to write the number to be taken under the other given number, as has been required in several exercises, and to subtract by columns. In this case we write the difference underneath each column, as ascertained. *Find the difference first in the right-hand column, here composed of ones, or units; afterward, in the column next to the left, here composed of tens; then in the columns further to the left, if any.*

Write the following subtractions, the number to be taken underneath the other, and below them a straight line, with the remainder under that.

FORM:	8	15	17
	6	4	12
	<hr style="width: 100%; border: 0.5px solid black;"/>	<hr style="width: 100%; border: 0.5px solid black;"/>	<hr style="width: 100%; border: 0.5px solid black;"/>
	2	11	5

29 — 18	29 — 16	29 — 14	29 — 12	29 — 10
29 — 8	29 — 6	29 — 4	29 — 2	29 — 19
29 — 17	29 — 15	29 — 13	29 — 11	29 — 9

29— 7	29— 5	29— 3	29— 1	28—18
28—16	28—14	28—12	28—10	28— 8
28— 6	28— 4	28— 2	28—17	28—15
28—13	28—11	28— 7	28— 5	28— 3
28— 1	27—17	27—15	27—13	27—11
27— 7	27— 5	27— 3	27— 2	27—16
27—14	27—12	27—10	27— 6	27— 4

DRILL: Read, as the teacher points, first, 8 ones from 9 ones, 1, written in the ones or units place; 1 ten from 2 tens, 1, written in the tens place: whole difference, $10 + 1 = 11$; 18 from 29, 11 remain, &c. Or taking $29 - 1$: 1 unit from 9 units, 8, written in the place of units; 2 tens remaining, written in the place of tens: whole difference, $20 + 8 = 28$; 1 from 29, 28 remain, &c. Or, taking $29 - 10$: nothing being taken from the 9 ones, 9 is written in the remainder in the units place; 1 ten from 2 tens, 1, written in the tens place: whole difference $10 + 9 = 19$; 10 from 29, 19 remain. Show how the difference + the subtrahend = the minuend, and let the scholars also point it out. Results being erased, let them be stated at sight. Then the reproduction.

XCV.

Write as in Exercise XCIV.

26—16	26—14	26—12	26—10	26— 6
26— 4	26— 2	26—15	26—13	26—11
26— 5	26— 3	26— 1	25—15	25—13
25—11	25— 5	25— 3	25— 1	25—14
25—12	25—10	25— 4	25— 2	24—14
24—12	24—10	24— 4	24— 2	24—13
24—11	24— 3	24— 1	23—13	23—11
23— 3	23— 1	23—12	23—10	23— 2
22—12	22—10	22— 2	22—11	21—11

Drill as in Exercise XCIV.

XCVI.

23. In subtraction, the number which is to be diminished, or lessened, is the *Minuend*.

24. The number to be taken from it, or subtracted, is the *Subtrahend*.

25. The number found by subtraction is the *Difference*, or *Remainder*.

In the subtraction, $8 - 6 = 2$, which is the minuend? which the subtrahend? which the remainder? In this, $10 - 7 = 3$, which is the subtrahend? which the remainder? which the minuend?

Continue the exercise, until each pupil can correctly answer, on the instant.

If we have the numbers 23 and 9 given, to find their difference, the units figure in the subtrahend is greater than that in the minuend. $23 = 20 + 3 = 10 + 10 + 3 = 2 \text{ tens} + 3$. To take the 9 from the minuend, we must first take one of the tens expressed in it, and add it to the 3: 1 ten = 10 ones; $10 + 3 = 13$ units, 9 units from 13 units, 4, which is written in the remainder, in the units place. Having already subtracted one of the tens, there remains but one, which is written in the remainder, in its proper place. If we are to find the difference between 21 and 12, we take one of the tens and add it, before we can subtract the unit figure of the subtrahend, to the unit figure of the minuend, making 11 units. $11 - 2 = 9$ units, which we write in the remainder. One of the tens being already subtracted, but 1 ten remains in the minuend; that in the subtrahend being taken from it, nothing remains, which shows that the 9 already written in the remainder is the whole difference.

Write as in Exercise XCIV.

21 — 2	23 — 5	24 — 9	22 — 8	26 — 7
25 — 8	27 — 9	28 — 9	25 — 7	24 — 5
23 — 9	22 — 4	21 — 7	27 — 8	26 — 8
21 — 4	22 — 3	23 — 4	24 — 6	25 — 9
26 — 9	22 — 5	23 — 7	21 — 6	25 — 6

Drill as in Exercise XCIV.

XCVII.

Write as in Exercise XCIV.

28 — 19	27 — 19	26 — 18	24 — 17
23 — 6	22 — 9	21 — 16	27 — 18
26 — 19	25 — 16	24 — 8	23 — 16
26 — 17	25 — 18	24 — 7	23 — 19

22— 6	21—18	25—19	24—18
22—18	21— 9	25—17	24—15
23— 8	22—19	21— 8	24—19
23—17	22— 7	21—19	24—16
23—14	22—17	21—18	21—12
22—13	23—15	23—18	22—14
21— 3	21— 5	22—15	21—13
21—17	21—14	22—16	21—15

Drill as in Exercise XCIV.

XCVIII.

Mental.

If from a lot of 29 oranges you take 5, how many will remain? If from the 29 you take 7? If you take 9? If 11? If 13? If 15? If 17? If 19? If 21? If 23? If 25? If 27? If 3? If 1? If 28? If 26? If 24? If 22? If 20? If 18? If 16? If 14? If 12? If 10? If 8? If 6? If 4? If 2?

If from 29 oranges you take 5, how many remain? If from the remainder you take 3? If from that remainder, 7? If from that remainder, 6? If from that remainder, 8?

There are in a pasture 25 sheep, of which 8 are taken and folded: how many remain at large? Of these, 8 are put into another fold: how many now remain? 9 are put into another fold: how many yet remain?

Reproduce.

XCIX.

Mental.

In a little library are 28 volumes: how many remain if 9 are loaned out? How many of the 28 remain if 7 are loaned out? How many if 11 are loaned out? If 15? If 8? If 14? If 3? If 10? If 12? If 16? If 17? If 4? If 13? If 18? If 5? If 19? If 6? If 20?

A man had 27 horses : how many were left when he had sent away 13 of them? When he had sent away 5 more? When yet 9 more?

Having 26 horses, how many would have been left if he had sent away 9? If of the 26 he had sent away 7? If 11? If 13? If 19? If 15? If 17? If 8? If 10? If 12? If 14? If 16? If 18? If 20? If 21?

Reproduce.

C.

Write the following additions and multiplications:

$$\begin{array}{ll} \text{FORM:} & 4 + 2 = 6 & 3 + 3 = 6 \\ & 4 \times 2 = 8 & 3 \times 3 = 9 \end{array}$$

Multiply 1 by 9; 1 by 7; 1 by 11; 1 by 5; 1 by 3; 1 by 10; 1 by 8; 1 by 12; 1 by 6; 1 by 4; 1 by 2; 2 by 2; 2 by 4; 2 by 6; 2 by 8; 2 by 9; 2 by 3; 2 by 5; 2 by 7; 3 by 2; 3 by 3; 3 by 5; 3 by 6; 3 by 4; 4 by 2; 4 by 4; 4 by 3; 5 by 3; 5 by 2; 6 by 3; 6 by 2; 7 by 2; 8 by 2; 9 by 2.

Add 10 Twos; 11 Twos; 12 Twos.

Multiply 2 by 10; 2 by 11; 2 by 12.

DRILL : Read, the multiplications, first, 1 multiplied by 9 equals 9, &c.; then, 9 times 1 are 9, &c.; then, 9 ones are 9, &c.; the additions as in former exercises. Then, a *memoriter* drill, and the reproduction.

CI.

Write as in Exercise C.

Add 7 Threes; 9 Threes; 8 Threes; 5 Fours; 7 Fours; 6 Fours; 4 Fives; 5 Fives; 4 Sixes; 3 Sevens; 4 Sevens; 3 Eights; 3 Nines; 2 Tens; 2 Elevens; 2 Twelves.

Multiply 3 by 7; 3 by 9; 3 by 8; 4 by 5; 4 by 7; 4 by 6; 5 by 4; 5 by 5; 6 by 4; 7 by 3; 7 by 4; 8 by 3; 9 by 3; 10 by 2; 11 by 2; 12 by 2.

5×4	11×2	8×9	7×4	8×8
10×2	4×5	6×4	7×3	3×7
8×3	4×7	5×5	12×2	4×6
9×3				

Drill as in Exercise C.

CII.

Mental.

A man wishes to give 4 boys each 7 walnuts: how many must he have? If each 5 walnuts? If each 3 walnuts? If each 6? If each 4? If each 2?—If 3 boys each 9? If each 7? If each 5? If each 3? If each 8? If each 6? If each 4? If each 2?

A lady wishes to give 5 girls each 5 peaches: how many must she have? If each 4 peaches? If each 3? If each 2?—If 6 girls each 4 peaches? If each 3? If each 2?—If 7 girls each 4 peaches? If each 3? If each 2?—If 8 girls each 3 peaches? If each 2?—If 9 girls each 3 peaches? If each 2?

A farmer had 2 pasture lots, grazing in each of which were 9 cows: how many cows had he? If there were 11 in each, how many? If 13 in each? If 14? If 10? If 12? If 8? If 7?

Reproduce.

CIII.

Write the following divisions.

$$\begin{array}{l} \text{FORM:} \quad 4 \div 2 = 2 \\ \quad \quad \quad 8 \div 8 = 1 \\ \quad \quad \quad 6 \div 1 = 6 \end{array}$$

How many times is 2 contained in 24? in 22? in 20? in 18? in 16? in 14? in 12? in 10? in 8? in 6? in 4? in 2?

How many times is 3 contained in 27? in 24? in 21? in 18? in 15? in 12? in 9? in 6? in 3?

How many times is 4 contained in 28? in 24? in 20? in 16? in 12? in 8? in 4?

How many times is 5 contained in 25? in 20? in 15? in 10? in 5?

How many times is 6 contained in 24? in 18? in 12? in 6? 7 in 28? 7 in 21? 7 in 14? 7 in 7? 8 in 24? 8 in 16? 8 in 8? 9 in 27? 9 in 18? 9 in 9?

DRILL: Read, first, 24 divided by 2 equals 12, &c.; then, 2 in 24, 12 times; then, multiply the quotient by the divisor, and show that this produces the dividend; then, erasing results, let these be stated at sight; then, a *memoriter* drill, and the reproduction.

CIV:

Write the following divisions, the dividend above the divisor, and a line drawn between them:

FORM: $\frac{4}{2} = 2$
 $\frac{8}{8} = 1$
 $\frac{4}{6} = 6$

Divide 20 by 4 14 by 2 18 by 3 20 by 2 25 by 5
 8 by 2 24 by 3 12 by 4 15 by 5 12 by 2 21 by 3
 28 by 4 18 by 6 4 by 2 12 by 3 10 by 2 6 by 3
 21 by 7 16 by 2 24 by 4 20 by 5 6 by 2 27 by 3
 22 by 2 8 by 4 24 by 6 14 by 7 24 by 8 24 by 2
 15 by 3 18 by 9 18 by 2 9 by 3 16 by 4 10 by 5
 12 by 6 28 by 7 16 by 8 27 by 9

Drill as in Exercise CIII.

CV.

Write the following groups, with results, according to the forms already prescribed.

24 + 4 24 - 4 24 ÷ 4 22 + 2 22 - 2 22 ÷ 2
 20 + 5 20 - 5 20 ÷ 5 20 + 4 20 - 4 20 ÷ 4
 20 + 2 20 - 2 20 ÷ 2 18 + 9 18 - 9 18 ÷ 9

$18 + 6$	$18 - 6$	$18 \div 6$	$18 + 2$	$18 - 2$	$18 \div 2$
$16 + 8$	$16 - 8$	$16 \div 8$	$16 + 4$	$16 - 4$	$16 \div 4$
$16 + 2$	$16 - 2$	$16 \div 2$	$14 + 7$	$14 - 7$	$14 \div 7$
$14 + 2$	$14 - 2$	$14 \div 2$	$12 + 6$	$12 - 6$	$12 \div 6$
$12 + 4$	$12 - 4$	$12 \div 4$	$12 + 2$	$12 - 2$	$12 \div 2$
$10 + 5$	$10 - 5$	$10 \div 5$	$10 + 2$	$10 - 2$	$10 \div 2$

Drill as in previous exercises.

CVI.

Mental.

28 pears are to be equally divided between 2 children: how many will each have? If equally divided among 4 children, how many? If among 7?

27 melons are to be separated into 3 equal lots: how many will there be in each lot? If into 9 lots?

25 trees are to be planted in 5 rows of equal number: how many in each row? 24 trees in 4 rows: how many in each row? In 2 rows? In 3 rows? In 6 rows? In 8 rows?

22 pupils are to be equally divided into 2 classes: how many will there be in each? 21 into 3 classes: how many in each? Into 7? 20 into 2 classes? Into 4? Into 5?

Reproduce.

CHAPTER THE FOURTH.

Thirty to Thirty-nine.

CVII.

26. $29 + 1 = 20 + (9 + 1) = 10 + 10 + (9 + 1) = 10 + 10 + 10 = 3 \text{ Tens}$. 3 in the first place stands for 3 Ones: in the second place it stands for 3 Tens: thus, 30. We read 3 Tens, *Thirty*. $30 + 1$, we write 31: the 1 is

One, the 3 is *Thirty*. 30, or 3 tens, we write in letters, XXX; the units over by their appropriate letters in addition, as in the following table.

Write the following table upon the blackboard:

Thirty = 3 Tens + Nothing	XXX	30
Thirty-one = 3 Tens + One	XXXI	31
Thirty-two = 3 Tens + Two	XXXII	32
Thirty-three = 3 Tens + Three	XXXIII	33
Thirty-four = 3 Tens + Four	XXXIV	34
Thirty-five = 3 Tens + Five	XXXV	35
Thirty-six = 3 Tens + Six	XXXVI	36
Thirty-seven = 3 Tens + Seven	XXXVII	37
Thirty-eight = 3 Tens + Eight	XXXVIII	38
Thirty-nine = 3 Tens + Nine	XXXIX	39

Drill as in Exercise XXXVI. Why do you reckon the 3 as *thirty*?

CVIII.

Read the following numbers:

10; 17; 29; 33; 20; 15; 13; 30; 11; 28; 26; 37; 12;
 14; 27; 31; 16; 25; 39; 24; 18; 32; 21; 23; 19; 35;
 22; 29; 28; 34; 27; 26; 38; 22; 21; 36; 20; 25; 33;
 24; 23; 30; 19; 18; 37; 17; 16; 31; 13; 12; 39; 11;
 15; 32; 14; 10; 35; 34; 38; 36. XXII, XXIX,
 XXXIII, XX, XXIII, XXXV, XXX, XXVIII, XXVI,
 XXXVIII, XXXVII, XXVII, XXXI, XXV, XXXIX,
 XXIV, XXXII, XXI, XXXIV.

Drill as in Exercise XXXVII. What does 1 stand for in the first place? In the second? 3 in the first? in the second? 2 in the first? in the second? Why?

CLX.

Write the following numbers, in letters and figures:

Nineteen	Twenty-nine	Thirty-nine
Eighteen	Twenty-eight	Thirty-eight
Seventeen	Twenty-seven	Thirty-seven
Sixteen	Twenty-six	Thirty-six
Fifteen	Twenty-five	Thirty-five
Fourteen	Twenty-four	Thirty-four
Thirteen	Twenty-three	Thirty-three
Twelve	Twenty-two	Thirty-two
Eleven	Twenty-one	Thirty-one
Ten	Twenty	Thirty

Continue the exercise, until each pupil writes neatly and promptly every number up to 39. Read and analyze.

CX.

Count from 1 to 39.

Write the following additions:

$$\begin{array}{l} \text{FORM:} \quad 1 + 3 = 4 \\ \quad \quad \quad 7 + 2 = 9 \\ \quad \quad \quad 4 + 4 = 8 \end{array}$$

29 and 1 are how many? 30 and 1? 31 and 1? 32 and 1? 33 and 1? 34 and 1? 35 and 1? 36 and 1? 37 and 1? 38 and 1? 28 and 2? 30 and 2? 32 and 2? 34 and 2? 36 and 2? 29 and 2? 31 and 2? 33 and 2? 35 and 2? 37 and 2? 27 and 3? 30 and 3? 33 and 3? 36 and 3? 28 and 3? 31 and 3? 34 and 3? 29 and 3? 32 and 3? 35 and 3? 26 and 4? 30 and 4? 34 and 4? 27 and 4? 31 and 4? 35 and 4? 28 and 4? 32 and 4? 29 and 4? 33 and 4?

DRILL: Read, first, 29 plus 1 equals 30, &c.; then, 29 and 1 are 30, &c.; then, let the numbers occupying two places be analyzed; then, erasing amounts, let them be named at sight; then a *memoriter* drill, and the reproduction.

CXI.

Count by twos from 1 to 39, 2 to 38.

Write as in Exercise CX.

25 and 5? 30 and 5? 26 and 5? 31 and 5?
 27 and 5? 32 and 5? 28 and 5? 33 and 5? 29 and 5? 34
 and 5? 24 and 6? 30 and 6? 25 and 6? 31 and 6? 26 and
 6? 32 and 6? 27 and 6? 33 and 6? 28 and 6? 29 and 6?
 23 and 7? 30 and 7? 24 and 7? 31 and 7? 25 and 7? 32
 and 7? 26 and 7? 27 and 7? 28 and 7? 29 and 7? 22 and
 8? 30 and 8? 23 and 8? 31 and 8? 24 and 8? 25 and 8?
 26 and 8? 27 and 8? 28 and 8? 29 and 8? 21 and 9? 30
 and 9? 22 and 9? 23 and 9? 24 and 9? 25 and 9? 26 and
 9? 27 and 9? 28 and 9? 29 and 9? .

Drill as in Exercise CX.

CXII.

Count by threes from 1 to 37, 2 to 38, 3 to 39.

Write as in Exercise CX.

12 + 2	22 + 2	32 + 2	12 + 3	22 + 3
32 + 3	12 + 4	22 + 4	32 + 4	12 + 5
22 + 5	32 + 5	12 + 6	22 + 6	32 + 6
12 + 7	22 + 7	32 + 7	12 + 8	22 + 8
13 + 2	23 + 2	33 + 2	13 + 3	23 + 3
33 + 3	13 + 4	23 + 4	33 + 4	13 + 5
23 + 5	33 + 5	13 + 6	23 + 6	33 + 6
13 + 7	23 + 7	14 + 2	24 + 2	34 + 2
14 + 3	24 + 3	34 + 3	14 + 4	24 + 4
34 + 4	14 + 5	24 + 5	34 + 5	14 + 6
24 + 6	15 + 2	25 + 2	35 + 2	15 + 3
25 + 3	35 + 3	15 + 4	25 + 4	35 + 4
15 + 5	25 + 5			

Drill as in Exercise CX.

CXIII.

Count by fours from 1 to 37, 2 to 38, 3 to 39, 4 to 36.

Write as in Exercise CX.

16 + 2	26 + 2	36 + 2	16 + 3	26 + 3
36 + 3	16 + 4	26 + 4	17 + 2	27 + 2
37 + 2	17 + 3	27 + 3	18 + 2	28 + 2
9 + 2	19 + 2	29 + 2	9 + 3	19 + 3
29 + 3	9 + 4	19 + 4	29 + 4	9 + 5
19 + 5	29 + 5	9 + 6	19 + 6	29 + 6
9 + 7	19 + 7	29 + 7	9 + 8	19 + 8
29 + 8	9 + 9	19 + 9	29 + 9	8 + 3
18 + 3	28 + 3	8 + 4	18 + 4	28 + 4
8 + 5	18 + 5	28 + 5	8 + 6	18 + 6
28 + 6	8 + 7	18 + 7	28 + 7	8 + 8
18 + 8	28 + 8	8 + 9	18 + 9	28 + 9

Drill as in Exercise CX

CXIV.

Count by fives from 1 to 36, 2 to 37, 3 to 38, 4 to 39, 5 to 35.

Write as in Exercise CX.

7 + 4	17 + 4	27 + 4	7 + 5	17 + 5
27 + 5	7 + 6	17 + 6	27 + 6	7 + 7
17 + 7	27 + 7	7 + 8	17 + 8	27 + 8
7 + 9	17 + 9	27 + 9	6 + 5	16 + 5
26 + 5	6 + 6	16 + 6	26 + 6	6 + 7
16 + 7	26 + 7	6 + 8	16 + 8	26 + 8
6 + 9	16 + 9	26 + 9	5 + 6	15 + 6
25 + 6	5 + 7	15 + 7	25 + 7	5 + 8
15 + 8	25 + 8	5 + 9	15 + 9	25 + 9
4 + 7	14 + 7	24 + 7	4 + 8	14 + 8
24 + 8	14 + 9	24 + 9	3 + 8	13 + 8
23 + 8	13 + 9	23 + 9	12 + 9	22 + 9

Drill as in Exercise CX.

CXV.

Count by sixes from 1 to 37, 2 to 38, 3 to 39, 4 to 34, 5 to 35, 6 to 36.

Write the following numbers, in columns, placing the amount beneath, with a line above it.

$$2 + 3 + 4 + 5 + 6$$

$$4 + 5 + 6 + 7 + 8$$

$$3 + 6 + 9 + 7 + 4$$

$$5 + 7 + 9 + 7 + 9$$

$$4 + 9 + 7 + 8 + 7$$

$$3 + 9 + 9 + 8 + 7$$

$$7 + 9 + 8 + 7 + 7$$

$$3 + 7 + 4 + 6 + 8$$

$$5 + 7 + 4 + 8 + 9$$

$$7 + 7 + 8 + 6 + 7$$

$$9 + 7 + 8 + 8 + 3$$

$$4 + 8 + 7 + 3 + 9$$

$$5 + 9 + 7 + 7 + 7$$

$$4 + 8 + 7 + 6 + 7$$

$$3 + 4 + 5 + 6 + 7$$

$$5 + 6 + 7 + 8 + 9$$

$$6 + 9 + 7 + 4 + 8$$

$$4 + 8 + 6 + 3 + 8$$

$$5 + 9 + 6 + 4 + 9$$

$$2 + 9 + 7 + 8 + 4$$

$$8 + 9 + 7 + 5 + 6$$

$$4 + 7 + 8 + 2 + 9$$

$$6 + 7 + 5 + 8 + 9$$

$$8 + 7 + 6 + 9 + 5$$

$$3 + 8 + 3 + 9 + 8$$

$$5 + 8 + 7 + 5 + 8$$

$$4 + 4 + 7 + 8 + 8$$

$$7 + 5 + 5 + 9 + 9$$

DRILL: Read, first, 2 and 3 are 5, and 4 are 9, and 5 are 14, and 6 are 20, &c.; then, 2, 5, 9, 14, 20, &c.; then, erasing results, let these be stated at sight; then a *memoriter* drill, and the reproduction.

CXVI.

Write the following numbers, as in the preceding exercise, with amounts:

$$12 + 13 + 14$$

$$11 + 19 + 9$$

$$13 + 17 + 6$$

$$16 + 6 + 13$$

$$4 + 17 + 18$$

$$11 + 16 + 12$$

$$4 + 15 + 18$$

$$17 + 12 + 8$$

$$10 + 17 + 12$$

$$14 + 15 + 8$$

$$15 + 14 + 7$$

$$3 + 13 + 17$$

$$16 + 12 + 9$$

$$6 + 16 + 15$$

$$15 + 16 + 5$$

$$12 + 14 + 8$$

$$7 + 17 + 13$$

$$5 + 15 + 17$$

$$10 + 17 + 12$$

$$17 + 14 + 5$$

$$17 + 11 + 10$$

13 + 7 + 14	12 + 5 + 15	7 + 16 + 8
4 + 4 + 18	14 + 14 + 10	15 + 15 + 5
16 + 16 + 5	13 + 13 + 7	12 + 12 + 9
13 + 4 + 15	4 + 15 + 16	5 + 16 + 17
12 + 4 + 15	3 + 15 + 16	13 + 8 + 18
3 + 16 + 11	8 + 11 + 14	15 + 11 + 4
7 + 15 + 14	18 + 7 + 11	12 + 6 + 15
16 + 13 + 3	19 + 8 + 12	6 + 11 + 13

DRILL: Read, first, 2 and 3 and 4 units are 9 units, to be written in the units place, 1 and 1 and 1 ten are 3 tens, to be written in the second place: total, 30 plus 9, or 39, &c.; then, 12 and 13 are 25 and 14 are 39, &c.; then analyze the numbers occupying two places; then, erasing results, let these be stated at sight; then, a *memoriter* drill, and the reproduction.

CXVII.

Mental.

Several groups of boys have a number of walnuts, as below: how many have each group of four? *

James	4	Charles	18	Levi	9	David	7
Peter	7	Walter	9	Daniel	5	Francis	13
William	14	Samuel	5	Moses	13	Joseph	2
John	9	Howard	3	Reuben	8	Theodore	7

Some girls have a number of beautiful roses, as below: how many have each of these groups? *

Mary	6	Edith	15	Eliza	7	Lydia	9
Eva	9	Sarah	9	Delia	8	Julia	9
Jane	12	Rachel	5	Ida	11	Anna	9
Martha	8	Margaret	10	Ada	9	Gertrude	9

* Group these by vertical rows, by horizontal rows, by quarter-sections, and otherwise.

A man bought a barrel of flour for 11 dollars; 12 pounds of sugar for 2 dollars; a barrel of apples for 6 dollars; 12 bushels of potatoes for 9 dollars; and 20 pounds of butter for 8 dollars; how many dollars in all did he expend?

There are in a closet 15 oranges, 12 apples, and 9 lemons: how many pieces of fruit in all? 7 oranges, 6 apples, 8 pears, 5 lemons, 11 pine-apples? 4 pears, 17 peaches, and 17 oranges?

Reproduce.

CXVIII.

Count backward from 39 to 1.

Write the following groups of numbers, with amounts or differences, as the case may be.

FORM:	$8 + 1 = 9$	$6 + 2 = 8$
	$8 - 7 = 1$	$6 - 2 = 4$

How many are 29 and 1? 30 and 1? 31 and 1? 32 and 1? 33 and 1? 34 and 1? 35 and 1? 36 and 1? 37 and 1? 38 and 1?

What is the difference between 39 and 1? between 38 and 1? between 37 and 1? between 36 and 1? between 35 and 1? between 34 and 1? between 33 and 1? between 32 and 1? between 31 and 1? between 30 and 1?

Add 28 and 2; 30 and 2; 32 and 2; 34 and 2; 36 and 2; 29 and 2; 31 and 2; 33 and 2; 35 and 2; 37 and 2.

Find the difference between 39 and 2; between 37 and 2; between 35 and 2; between 33 and 2; between 31 and 2; between 38 and 2; between 36 and 2; between 34 and 2; between 32 and 2; between 30 and 2.

Add 27 and 3; 30 and 3; 33 and 3; 36 and 3; 28 and 3; 31 and 3; 34 and 3; 29 and 3; 32 and 3; 35 and 3.

Find the difference between 39 and 3; between 38 and 3;

between 33 and 3; between 30 and 3; between 38 and 3; between 35 and 3; between 32 and 3; between 37 and 3; between 34 and 3; between 31 and 3.

Drill as in Exercise LXXXVI.

CXIX.

Count backward by twos from 39 to 1, 38 to 2.

Write as in Exercise CXVIII.

Add 26 and 4; 30 and 4; 34 and 4; 27 and 4; 31 and 4; 35 and 4; 28 and 4; 32 and 4; 29 and 4; 33 and 4.

Subtract 4 from 39; 4 from 35; 4 from 31; 4 from 38; 4 from 34; 4 from 30; 4 from 37; 4 from 33; 4 from 36; 4 from 32.

Add 25 and 5; 30 and 5; 26 and 5; 31 and 5; 27 and 5; 32 and 5; 28 and 5; 33 and 5; 29 and 5; 34 and 5.

Take 5 from 39; 5 from 34; 5 from 38; 5 from 33; 5 from 37; 5 from 32; 5 from 36; 5 from 31; 5 from 35; 5 from 30.

Add 24 and 6; 30 and 6; 25 and 6; 31 and 6; 26 and 6; 32 and 6; 27 and 6; 33 and 6; 28 and 6; 29 and 6.

Take 6 from 39; 6 from 33; 6 from 38; 6 from 32; 6 from 37; 6 from 31; 6 from 36; 6 from 30; 6 from 35; 6 from 34.

Drill as in Exercise LXXXVI.

CXX.

Count backward by threes from 39 to 3, 38 to 2, 37 to 1.

Write as in Exercise CXVIII.

Add 23 and 7; 30 and 7; 24 and 7; 31 and 7; 25 and 7; 32 and 7; 26 and 7; 27 and 7; 28 and 7; 29 and 7.

Take 7 from 39; 7 from 32; 7 from 38; 7 from 31; 7 from 37; 7 from 30; 7 from 36; 7 from 35; 7 from 34; 7 from 33.

Add 22 and 8; 30 and 8; 23 and 8; 31 and 8; 24 and 8; 25 and 8; 26 and 8; 27 and 8; 28 and 8; 29 and 8.

Take 8 from 39; 8 from 31; 8 from 38; 8 from 30; 8 from 37; 8 from 36; 8 from 35; 8 from 34; 8 from 33; 8 from 32.

Add 21 and 9; 30 and 9; 22 and 9; 23 and 9; 24 and 9; 25 and 9; 26 and 9; 27 and 9; 28 and 9; 29 and 9.

Take 9 from 39; 9 from 30; 9 from 38; 9 from 37; 9 from 36; 9 from 35; 9 from 34; 9 from 33; 9 from 32; 9 from 31.

Drill as in Exercise LXXXVI.

CXXI.

Count backward by fours from 39 to 3, 38 to 2, 37 to 1, 36 to 4.

Write as in Exercise CXVIII.

Add 4 and 35; 4 and 33; 4 and 31; 4 and 29; 4 and 27; 4 and 34; 4 and 32; 4 and 30; 4 and 28; 4 and 26; 7 and 32; 7 and 30; 7 and 28; 7 and 26; 7 and 24; 7 and 31; 7 and 29; 7 and 27; 7 and 25; 7 and 23; 1 and 38; 1 and 36; 1 and 34; 1 and 32; 1 and 30; 1 and 37; 1 and 35; 1 and 33; 1 and 31; 1 and 29.

Take 4 from 39; 4 from 37; 4 from 35; 4 from 33; 4 from 31; 4 from 38; 4 from 36; 4 from 34; 4 from 32; 4 from 30; 7 from 39; 7 from 37; 7 from 35; 7 from 33; 7 from 31; 7 from 38; 7 from 36; 7 from 34; 7 from 32; 7 from 30; 1 from 39; 1 from 37; 1 from 35; 1 from 33; 1 from 31; 1 from 38; 1 from 36; 1 from 34; 1 from 32; 1 from 30.

Drill as in Exercise LXXXVI.

CXXII.

Count backward by fives from 39 to 4, 38 to 3, 37 to 2, 36 to 1, 35 to 5.

Write as in Exercise CXVIII.

Add 9 and 30; 9 and 28; 9 and 26; 9 and 24; 9 and 22; 9 and 29; 9 and 27; 9 and 25; 9 and 23; 9 and 21; 2 and 37; 2 and 35; 2 and 33; 2 and 31; 2 and 29; 2 and 36; 2 and 34; 2 and 32; 2 and 30; 2 and 28; 3 and 36; 3 and 34; 3 and 32; 3 and 30; 3 and 28; 3 and 35; 3 and 33; 3 and 30; 3 and 27.

Take 9 from 39; 9 from 37; 9 from 35; 9 from 33; 9 from 31; 9 from 38; 9 from 36; 9 from 34; 9 from 32; 9 from 30; 2 from 39; 2 from 37; 2 from 35; 2 from 33; 2 from 31; 2 from 38; 2 from 36; 2 from 34; 2 from 32; 2 from 30; 3 from 39; 3 from 37; 3 from 35; 3 from 33; 3 from 31; 3 from 38; 3 from 36; 3 from 34; 3 from 32; 3 from 30.

Drill as in Exercise LXXXVI.

CXXIII.

Count backward by sixes from 39 to 3, 38 to 2, 37 to 1, 36 to 6, 35 to 5, 34 to 4.

Write as in Exercise CXVIII.

Add 6 and 33; 6 and 31; 6 and 29; 6 and 27; 6 and 25; 6 and 32; 6 and 30; 6 and 28; 6 and 26; 6 and 24; 8 and 31; 8 and 29; 8 and 27; 8 and 25; 8 and 23; 8 and 30; 8 and 28; 8 and 26; 8 and 24; 8 and 22; 5 and 34; 5 and 32; 5 and 30; 5 and 28; 5 and 26; 5 and 33; 5 and 31; 5 and 29; 5 and 27; 5 and 25.

Take 6 from 39; 6 from 37; 6 from 35; 6 from 33; 6 from 31; 6 from 38; 6 from 36; 6 from 34; 6 from 32; 6 from 30; 8 from 39; 8 from 37; 8 from 35; 8 from 33; 8 from 31; 8 from 38; 8 from 36; 8 from 34; 8 from 32; 8

from 30; 5 from 39; 5 from 37; 5 from 35; 5 from 33;
5 from 31; 5 from 38; 5 from 36; 5 from 34; 5 from 32;
5 from 30.

Drill as in Exercise LXXXVI.

CXXIV.

Write the following subtractions, the subtrahend underneath the minuend, and below them a straight line, with the remainder under that.

39 — 28	39 — 26	39 — 24	39 — 22
39 — 20	39 — 18	39 — 16	39 — 14
39 — 12	39 — 10	39 — 29	39 — 27
39 — 25	39 — 23	39 — 21	39 — 19
39 — 17	39 — 15	39 — 13	39 — 11
39 — 9	38 — 28	38 — 26	38 — 24
38 — 22	38 — 20	38 — 18	38 — 16
38 — 14	38 — 12	38 — 10	38 — 8
38 — 27	38 — 25	38 — 23	38 — 21
38 — 17	38 — 15	38 — 13	38 — 11
38 — 7	37 — 26	37 — 25	37 — 24
37 — 16	37 — 15	37 — 14	37 — 13

Drill as in Exercise XCIV.

CXXV.

Write as in Exercise CXXIV.

36 — 26	36 — 24	36 — 22	36 — 20
36 — 16	36 — 14	36 — 12	36 — 10
36 — 6	36 — 25	36 — 23	36 — 21
36 — 15	36 — 13	36 — 11	36 — 5
35 — 25	35 — 23	35 — 21	35 — 15
35 — 13	35 — 11	35 — 3	35 — 24
35 — 22	35 — 20	35 — 14	35 — 12
35 — 10	35 — 4	34 — 24	34 — 22
34 — 20	34 — 14	34 — 12	34 — 10

34 — 4	34 — 13	34 — 11	34 — 3
33 — 23	33 — 21	33 — 13	33 — 11
33 — 3	33 — 22	33 — 20	33 — 12
33 — 10	33 — 2	32 — 22	32 — 20
32 — 12	32 — 10	32 — 2	32 — 21
32 — 11	32 — 1	31 — 21	31 — 11
31 — 1	31 — 20	31 — 10	30 — 20

Drill as in Exercise XCIV.

CXXVI.

In the subtraction $36 - 26 = 10$, which is the subtrahend? which the remainder? which the minuend? In the subtraction $21 - 2 = 19$, is the units figure of the subtrahend greater or less than the units figure of the minuend? When a figure in a certain place in the subtrahend is *less* than that in the same place in the minuend, how do you proceed? When it is *greater*, what is necessary to be done?

27. In notation, 1 unit of any given place is always equal to 10 units of the place next at the right hand; 10 units of any given place are always equal to 1 unit of the place next at the left hand. Thus: 1 Ten = 10 Ones; 2 Tens = 20 Ones; 3 Tens = 30 Ones; 10 Ones = 1 Ten; 20 Ones = 2 Tens; 30 Ones = 3 Tens.

28. *In subtraction, when a figure in the subtrahend is greater than the figure of the same place or order in the minuend, take 1 unit from the next left-hand place in the minuend, and add to the figure at its right, its value, equal to 10 units of this place; then proceed to find the difference, and write it in the remainder. In this case, 1 unit of the next left-hand place of the minuend having already been subtracted, the figure standing there is to be treated as one less.*

Thus, we have $24 - 9$, to find the difference, or remainder. 9, in the subtrahend, is greater than 4, in the minuend. We take 1 of the 2 tens, in the minuend, equal to 10 ones, and add it to the 4 ones = 14 ones. $14 - 9$

= 5, which is written in the units place of the remainder. 1 of the tens in the minuend having already been subtracted, but 1 ten remains, and there being no ten in the subtrahend, that in the minuend is written in the remainder. $24 - 9 = (10 + 10 + 4) - 9 = 10 + (14 - 9) = 10 + 5 = 15$.

Write as in Exercise CXXIV.

38—29	38—19	38—9	37—29	37—19
37—9	37—28	37—18	37—8	36—29
36—19	36—9	36—28	36—18	36—8
36—27	36—17	36—7	35—29	35—19
35—9	35—28	35—18	35—8	35—27
35—17	35—7	35—26	35—16	35—6
34—29	34—19	34—9	34—28	34—18
34—8	34—27	34—17	34—4	34—26
34—16	34—6	34—25	34—15	34—5

Drill as in Exercise XCIV.

CXXVII.

Write as in Exercise CXXIV.

33—29	33—19	33—9	33—28	33—18
33—8	33—27	33—17	33—7	33—26
33—16	33—6	33—25	33—15	33—5
33—24	33—14	33—4	32—29	32—19
32—9	32—28	32—18	32—8	32—27
32—17	32—7	32—26	32—16	32—6
32—25	32—15	32—5	32—24	32—14
32—4	32—23	32—13	32—3	31—29
31—19	31—9	31—28	31—18	31—8
31—27	31—17	31—7	31—26	31—16
31—6	31—25	31—15	31—5	31—24
31—14	31—4	31—23	31—13	31—3
31—22	31—12	31—2	30—29	30—19
30—9	30—28	30—18	30—8	30—27
30—17	30—7	30—26	30—16	30—6

30 — 25	30 — 15	30 — 5	30 — 24	30 — 14
30 — 4	30 — 23	30 — 13	30 — 3	30 — 22
30 — 12	30 — 2	30 — 21	30 — 11	30 — 1

Drill as in Exercise XCIV.

CXXVIII.

Mental.

A boy was sent to a store with 39 cents to spend: for one article he paid 9 cents, for another 7, for another 12; how many cents did he spend altogether? How many cents had he left?

A furniture dealer sold in one week 5 bedsteads; in another 8 bedsteads; in another 9: how many did he sell in the 3 weeks? In the beginning, he had 31 on hand: how many were left at the end of the 3 weeks?

A grocer had 35 bushels of potatoes on hand: one day he sold 6 bushels, the second he sold 7 bushels, the third he sold 5 bushels; how many had he sold? and how many had he left? He then bought 17 bushels: how many did he then have?

A drover, having 37 sheep, divided them into two flocks: in one there were 18 sheep; how many sheep were there in the other? If in one 16, how many in the other? If in one 20? If in one 15? If in one 23? If in one 13?

Mary is 8 years old, and her mother 30 years old: what is the difference of their ages?

A man bought a tub containing 36 pounds of butter: after a number of weeks he found it weighed 19 pounds; how much had he used? What did it weigh when he had used 28 pounds?

James was sent to the store with 38 cents. He paid 12 cents for some rice, and 15 cents for some flour: how many cents had he remaining?

Reproduce.

CXXIX.

Write the following multiplications :

$$\begin{array}{l} \text{FORM:} \quad 1 \times 2 = 2 \\ \quad \quad 1 \times 3 = 3 \\ \quad \quad 1 \times 4 = 4 \end{array}$$

How many are 2 times 1? 3 times 1? 4 times 1? 5 times 1? 6 times 1? 7 times 1? 8 times 1? 9 times 1? 10 times 1? 11 times 1? 12 times 1? 2 times 2? 3 times 2? 4 times 2? 5 times 2? 6 times 2? 7 times 2? 8 times 2? 9 times 2? 10 times 2? 11 times 2? 12 times 2? 2 times 3? 3 times 3? 4 times 3? 5 times 3? 6 times 3? 7 times 3? 8 times 3? 9 times 3? 2 times 4? 3 times 4? 4 times 4? 5 times 4? 6 times 4? 7 times 4? 2 times 5? 3 times 5? 4 times 5? 5 times 5? 2 times 6? 3 times 6? 4 times 6? 2 times 7? 3 times 7? 4 times 7? 2 times 8? 3 times 8? 2 times 9? 3 times 9?

Drill as in Exercise C.

CXXX.

Write the following additions and multiplications :

Add 10 Threes; 11 Threes; 12 Threes; 8 Fours; 9 Fours; 6 Fives; 7 Fives; 5 Sixes; 6 Sixes; 5 Sevens; 4 Eights; 4 Nines; 3 Tens; 3 Elevens; 3 Twelves.

Multiply 3 by 10; 3 by 11; 3 by 12; 4 by 8; 4 by 9; 5 by 6; 5 by 7; 6 by 5; 6 by 6; 7 by 5; 8 by 4; 9 by 4; 10 by 3; 11 by 3; 12 by 3.

$$\begin{array}{cccccc} 4 \times 6 & 5 \times 6 & 6 \times 6 & 4 \times 7 & 5 \times 7 & 4 \times 8 \\ 4 \times 9 & 3 \times 6 & 3 \times 7 & 3 \times 8 & 3 \times 9 & 3 \times 10 \\ 3 \times 11 & 3 \times 12 & 4 \times 5 & 5 \times 5 & 6 \times 5 & 7 \times 5 \\ 6 \times 3 & 7 \times 3 & 8 \times 3 & 9 \times 3 & 10 \times 3 & 11 \times 3 \\ 12 \times 3 & 6 \times 4 & 7 \times 4 & 8 \times 4 & 9 \times 4 & \end{array}$$

Drill as in Exercise C.

CXXXI.

Mental.

In one yard are 3 feet: how many feet are there in 12 yards? How many in 11 yards? How many in 10? In 9? In 8? In 7? In 6? In 5? In 4? In 3? In 2?

In one foot are 12 inches: how many inches are there in 2 feet? In 3 feet?

If hats cost 6 dollars each, what would 6 hats cost? What would 5 hats cost? 4 hats? 3 hats? 2 hats?

When flour is worth 11 dollars a barrel, what would 3 barrels of flour be worth?

What will 13 oranges cost, at three cents each? 12 oranges? 11 oranges? 10? 9? 8? 7? 6? 5? 4? 3? 2? 9 oranges, at 4 cents each? 8 oranges, at 4 cents? 7 oranges? 6? 5? 4? 3? 2? 7 oranges, at 5 cents each? 6 oranges, at 5 cents? 5 oranges? 4? 3? 2? 6 oranges, at 6 cents each? 5 oranges, at 6 cents? 4 oranges? 3? 2? 5 oranges, at 7 cents each? 4 oranges, at 7 cents? 3 oranges? 2? 4 oranges, at 8 cents each? 3 oranges, at 8 cents? 2 oranges? 4 oranges, at 9 cents each? 3 oranges, at 9 cents? 2 oranges? 3 oranges, at 10 cents each? 2 oranges, at 10 cents? 3 oranges, at 11 cents each? at 12 cents each? at 13 cents each? 2 oranges, at 11 cents each? at 12 cents each? at 13 cents each? at 14 cents? at 15 cents? at 16 cents? at 17 cents? at 18 cents? at 19 cents?

Reproduce.

CXXXII.

Write the following divisions:

$$\begin{array}{l} \text{Form:} \quad 4 \div 2 = 2 \\ \quad \quad 10 \div 5 = 2 \\ \quad \quad 16 \div 4 = 4 \end{array}$$

How many times is 2 contained in 24? in 22? in 20? in 18? in 16? in 14? in 12? in 10? in 8? in 6? in 4? in 2?

How many times is 3 contained in 36? in 33? in 30? in 27? in 24? in 21? in 18? in 15? in 12? in 9? in 6? in 3?

How many times is 4 contained in 36? in 32? in 28? in 24? in 20? in 16? in 12? in 8? in 4?

How many times is 5 contained in 35? in 30? in 25? in 20? in 15? in 10? in 5?

How many times is 6 contained in 36? in 30? in 24? in 18? in 12? in 6?

How many times is 7 contained in 35? in 28? in 21? in 14? in 7? 8 in 32? 8 in 24? 8 in 16? 8 in 8? 9 in 36? 9 in 27? 9 in 18? 9 in 9? 10 in 30? 10 in 20? 10 in 10? 11 in 33? 11 in 22? 11 in 11? 12 in 36? 12 in 24? 12 in 12?

Drill as in Exercise CIII.

CXXXIII.

Write the following divisions, the dividend above the divisor, and a line drawn between them.

FORM: $\frac{3}{2} = 2$ $\frac{10}{8} = 2$ $\frac{16}{4} = 4$

Divide 36 by 3; 36 by 4; 36 by 6; 36 by 9; 36 by 12; 35 by 7; 35 by 5; 33 by 3; 33 by 11; 32 by 4; 32 by 8; 30 by 3; 30 by 10; 28 by 4; 28 by 7; 24 by 2; 24 by 3; 24 by 4; 24 by 6; 24 by 8; 24 by 12; 22 by 2; 22 by 11; 20 by 2; 20 by 5; 20 by 4; 20 by 10; 18 by 2; 18 by 3; 18 by 6; 18 by 9; 16 by 2; 16 by 4; 16 by 8; 14 by 2; 14 by 7; 12 by 2; 12 by 3; 12 by 4; 12 by 6; 10 by 2; 10 by 5; 8 by 2; 8 by 4; 6 by 2; 6 by 3; 9 by 3; 4 by 2; 15 by 3; 15 by 5; 21 by 3; 21 by 7; 27 by 3; 27 by 9; 25 by 5; 30 by 5; 30 by 6.

Drill as in Exercise CIII.

CXXXIV.

Write the following groups, with results, according to the forms already prescribed :

$36 + 3$	$36 - 3$	$36 \div 3$	$36 - 4$	$36 \div 4$
$36 - 9$	$36 \div 9$	$35 - 5$	$35 \div 5$	$35 - 7$
$35 \div 7$	$33 + 3$	$33 - 3$	$33 \div 3$	$32 + 4$
$32 - 4$	$32 \div 4$	$32 - 8$	$32 \div 8$	$30 + 3$
$30 - 3$	$30 \div 3$	$30 + 5$	$30 - 5$	$30 \div 5$
$30 + 6$	$30 - 6$	$30 \div 6$	$28 + 4$	$28 - 4$
$28 \div 4$	$28 + 7$	$28 \div 7$	$28 - 7$	$27 + 9$
$27 - 9$	$27 \div 9$	$27 + 3$	$27 - 3$	$27 \div 3$
$25 + 5$	$25 - 5$	$25 \div 5$	$24 + 2$	$24 - 2$
$24 \div 2$	$24 + 3$	$24 - 3$	$24 \div 3$	$24 + 4$
$24 - 4$	$24 \div 4$	$24 + 6$	$24 - 6$	$24 \div 6$
$24 + 8$	$24 - 8$	$24 \div 8$	$22 + 2$	$22 - 2$
$22 \div 2$	$20 + 2$	$20 - 2$	$20 \div 2$	$20 + 5$
$20 - 5$	$20 \div 5$	$20 + 4$	$20 - 4$	$20 \div 4$
$18 + 2$	$18 - 2$	$18 \div 2$	$18 + 9$	$18 - 9$
$18 \div 9$	$18 + 3$	$18 \div 3$	$18 - 3$	$18 + 6$
$18 - 6$	$18 \div 6$	$16 + 2$	$16 - 2$	$16 \div 2$
$16 + 4$	$16 - 4$	$16 \div 4$	$16 + 8$	$16 - 8$
$16 \div 8$	$15 + 3$	$15 - 3$	$15 \div 3$	$15 \div 5$

Drill as in previous exercises.

CXXXV.

Mental.

89 lemons are to be divided into three equal lots: how many will there be in each lot? 36 are to be divided into 3 lots: how many in each? If into two lots: how many in each? If into 4 lots? If into 6 lots? If into 9? If into 12? 30 into 2 lots? Into 3 lots? Into 5 lots? Into 6 lots? Into 10 lots? 35 into 5 lots? Into 7 lots? 34 into 2 lots? 33 into 3 lots? Into 11 lots? 32 into 2

lots? Into 4 lots? Into 8 lots? 28 into 2 lots? Into 4 lots? Into 7 lots? 27 into 3 lots? Into 9 lots? 26 into 2 lots? 25 into 5 lots? 24 into 2 lots? Into 3 lots? Into 4 lots? Into 6 lots? Into 8 lots? Into 12 lots?

Mr. Smith expended 36 dollars for flour at 9 dollars a barrel: how many barrels of flour did he purchase? If he had bought 3 barrels of flour for 36 dollars, what would he have paid for each barrel?

How many pears, at 5 cents each, can be bought for 15 cents? For 35 cents? For 20 cents? For 30 cents? For 25 cents? For 10 cents?

How many sixes are there in 30? In 12? In 36? In 18? In 24?

How many fours are there in 36? In 8? In 32? In 12? In 28? In 16? In 24? In 20?

Reproduce.

CHAPTER THE FIFTH.

Forty to Forty-nine.

CXXXVI.

29. $39 + 1 = 30 + (9 + 1) = 30 + 10 = 3 \text{ Tens} + 1 \text{ Ten} = 4 \text{ Tens}$. For 4 Tens, we write 4 in the second place, thus, 40, which we read *Forty*. $40 + 1$, we write 41, the 4 being *Forty*, the 1, *One*. In letters, we write 40, XL, and the numbers following to 49, by adding to XL the appropriate letters for the units.

Write the following table upon the blackboard:

Forty = 4 Tens + Nothing,	XL	40
Forty-one = 4 Tens + One,	XLI	41
Forty-two = 4 Tens + Two,	XLII	42
Forty-three = 4 Tens + Three,	XLIII	43

Forty-four = 4 Tens + Four,	XLIV	44
Forty-five = 4 Tens + Five,	XLV	45
Forty-six = 4 Tens + Six,	XLVI	46
Forty-seven = 4 Tens + Seven,	XLVII	47
Forty-eight = 4 Tens + Eight,	XLVIII	48
Forty-nine = 4 Tens + Nine,	XLIX	49

Drill as in Exercise XXXVI. Why do you read the 4, *forty*?

CXXXVII.

Read the following numbers:

10; 17; 29; 40; 33; 20; 15; 41; 13; 30; 11; 42;
 28; 26; 37; 43; 12; 14; 27; 44; 31; 16; 25; 45; 39;
 24; 18; 46; 32; 21; 23; 47; 19; 35; 22; 48; 34; 38;
 49; 36. XL, XXXIII, XLI, XXX, XLII, XXXVII,
 XLIII, XLIV, XXXI, XLV, XXXIV, XXXIX, XLVI,
 XXXII, XLIX, XLVII, XXXV, XXXVI, XLVIII,
 XXXVIII.

Drill as in Exercise XXXVII. What number does 4 stand for in the first place? In the second? — and the others?

CXXXVIII.

Write the following numbers, in letters and figures.

Ten	Twenty	Thirty.	Forty
Eleven	Twenty-one	Thirty-one	Forty-one
Twelve	Twenty-two	Thirty-two	Forty-two
Thirteen	Twenty-three	Thirty-three	Forty-three
Fourteen	Twenty-four	Thirty-four	Forty-four
Fifteen	Twenty-five	Thirty-five	Forty-five
Sixteen	Twenty-six	Thirty-six	Forty-six
Seventeen	Twenty-seven	Thirty-seven	Forty-seven
Eighteen	Twenty-eight	Thirty-eight	Forty-eight
Nineteen	Twenty-nine	Thirty-nine	Forty-nine

Continue the exercise, until each pupil writes neatly and promptly every number up to 49. Read and analyze.

CXXXIX.

Count forward and backward, 1 to 49, 49 to 1.

Write the following additions :

$$\text{Form: } 11 + 3 = 14$$

$$17 + 2 = 19$$

$$14 + 4 = 18$$

Add 39 and 1; 40 and 1; 41 and 1; 42 and 1; 43 and 1; 44 and 1; 45 and 1; 46 and 1; 47 and 1; 48 and 1; 38 and 2; 40 and 2; 42 and 2; 44 and 2; 46 and 2; 39 and 2; 41 and 2; 43 and 2; 45 and 2; 47 and 2; 37 and 3; 40 and 3; 43 and 3; 46 and 3; 38 and 3; 41 and 3; 44 and 3; 39 and 3; 42 and 3; 45 and 3; 36 and 4; 40 and 4; 44 and 4; 37 and 4; 41 and 4; 45 and 4; 38 and 4; 42 and 4; 39 and 4; 43 and 4.

Drill as in Exercise CX.

CXL.

Count by twos from 1 to 49, 2 to 48.

Write as in Exercise CXXXIX.

Add 35 and 5; 40 and 5; 36 and 5; 41 and 5; 37 and 5; 42 and 5; 38 and 5; 43 and 5; 39 and 5; 44 and 5; 34 and 6; 40 and 6; 35 and 6; 41 and 6; 36 and 6; 42 and 6; 37 and 6; 43 and 6; 38 and 6; 39 and 6; 33 and 7; 40 and 7; 34 and 7; 41 and 7; 35 and 7; 42 and 7; 36 and 7; 37 and 7; 38 and 7; 39 and 7; 32 and 8; 40 and 8; 33 and 8; 41 and 8; 34 and 8; 35 and 8; 36 and 8; 37 and 8; 38 and 8; 39 and 8; 31 and 9; 40 and 9; 32 and 9; 33 and 9; 34 and 9; 35 and 9; 36 and 9; 37 and 9; 38 and 9; 39 and 9.

Drill as in Exercise CX.

CXLL

Count by threes from 1 to 49, 2 to 47, 3 to 48.

Write as in Exercise CXXXIX.

32 + 2	42 + 2	32 + 3	42 + 3
32 + 4	42 + 4	32 + 5	42 + 5
32 + 6	42 + 6	32 + 7	42 + 7
32 + 8	32 + 9	33 + 2	43 + 2
33 + 3	43 + 3	33 + 4	43 + 4
33 + 5	43 + 5	13 + 6	23 + 6
33 + 6	43 + 6	13 + 7	23 + 7
33 + 7	13 + 8	23 + 8	33 + 8
13 + 9	23 + 9	33 + 9	34 + 2
44 + 2	34 + 3	44 + 3	34 + 4
44 + 4	14 + 5	24 + 5	34 + 5
44 + 5	14 + 6	24 + 6	34 + 6
14 + 7	24 + 7	34 + 7	14 + 8
24 + 8	34 + 8	24 + 9	34 + 9

Drill as in Exercise CX.

CXLII.

Count by fours from 1 to 49, 2 to 46, 3 to 47, 4 to 48.

Write as in Exercise CXXXIX.

35 + 2	45 + 2	35 + 3	45 + 3
15 + 4	25 + 4	35 + 4	45 + 4
15 + 5	25 + 5	35 + 5	15 + 6
25 + 6	35 + 6	15 + 7	25 + 7
35 + 7	15 + 8	25 + 8	35 + 8
15 + 9	25 + 9	35 + 9	36 + 2
46 + 2	36 + 3	46 + 3	16 + 4
26 + 4	36 + 4	16 + 5	26 + 5
36 + 5	16 + 6	26 + 6	36 + 6
16 + 7	26 + 7	36 + 7	16 + 8

26 + 8	36 + 8	16 + 9	26 + 9
36 + 9	37 + 2	47 + 2	17 + 3
27 + 3	37 + 3	17 + 4	27 + 4
37 + 4	17 + 5	27 + 5	37 + 5

Drill as in Exercise CX.

CXLIII.

Count by fives from 1 to 46, 2 to 47, 3 to 48, 4 to 49, 5 to 45.

Write as in Exercise CXXXIX.

17 + 6	27 + 6	37 + 6	17 + 7
27 + 7	37 + 7	17 + 8	27 + 8
37 + 8	17 + 9	27 + 9	37 + 9
28 + 2	38 + 2	18 + 3	28 + 3
38 + 3	18 + 4	28 + 4	38 + 4
18 + 5	28 + 5	38 + 5	18 + 6
28 + 6	38 + 6	18 + 7	28 + 7
38 + 7	18 + 8	28 + 8	38 + 8
18 + 9	28 + 9	38 + 9	29 + 2
39 + 2	19 + 3	29 + 3	39 + 3
19 + 4	29 + 4	39 + 4	19 + 5
29 + 5	39 + 5	19 + 6	29 + 6
39 + 6	19 + 7	29 + 7	39 + 7
19 + 8	29 + 8	39 + 8	19 + 9
29 + 9	39 + 9		

Drill as in Exercise CX.

CXLIV.

Count by sixes from 1 to 49. 2 to 44, 3 to 45, 4 to 46, 5 to 47, 6 to 48.

Write the following numbers in columns, the amount beneath, with a line separating it from the numbers added:

3 + 4 + 5 + 6 + 7	4 + 5 + 6 + 7 + 8
5 + 6 + 7 + 8 + 9	6 + 7 + 8 + 9 + 9

$7+8+9+9+9$	$8+9+9+9+9$
$9+9+9+9+9$	$4+9+4+9+4$
$9+4+9+4+9$	$8+8+8+8+8$
$8+9+8+9+8$	$9+8+9+8+9$
$7+9+7+9+7$	$9+7+9+7+9$
$7+8+7+8+7$	$8+7+8+7+8$
$9+6+8+7+6$	$6+9+7+8+9$
$3+4+5+6+7+8$	$4+5+6+7+8+9$
$5+6+7+8+9+9$	$6+6+7+7+8+8$
$7+6+7+8+9+7$	$5+7+9+6+6+8$
$5+8+7+8+6+9$	$5+9+7+5+9+8$
$6+7+8+9+9+9$	$6+8+8+7+5+8$
$6+9+7+9+8+6$	$7+9+8+7+9+7$

Drill as in Exercise CXV.

CXLV.

Count by sevens from 1 to 43, 2 to 44, 3 to 45, 4 to 46, 5 to 47, 6 to 48, 7 to 49.

Write the following numbers, as in the preceding exercise, with amounts :

$12+23+14$	$17+12+18$	$15+16+15$
$11+19+19$	$10+27+12$	$12+24+8$
$13+17+16$	$14+15+18$	$17+17+13$
$16+6+23$	$15+14+17$	$5+15+27$
$14+17+18$	$13+13+17$	$10+27+12$
$21+16+12$	$16+12+19$	$17+14+15$
$14+15+18$	$16+16+15$	$17+11+20$
$13+17+14$	$12+15+15$	$17+16+8$
$14+14+18$	$14+24+10$	$15+15+15$
$16+16+16$	$13+13+13$	$12+12+19$
$13+14+15$	$14+15+16$	$15+16+17$
$12+14+15$	$14+14+14$	$13+15+16$
$13+18+18$	$13+16+11$	$18+11+14$

$$15 + 21 + 4$$

$$7 + 25 + 14$$

$$28 + 7 + 11$$

$$12 + 6 + 25$$

$$16 + 23 + 3$$

$$19 + 8 + 22$$

$$6 + 11 + 23$$

$$12 + 17 + 12$$

$$12 + 26 + 11$$

Drill as in Exercise CXVI.

CXLVI.

Mental.

One farmer brought to a drover 5 pigs; another, 7 pigs; another, 8 pigs; another, 6 pigs; another, 9 pigs; another, 13 pigs. The drover then started for market, with how many pigs?

A farmer's wife, gathering eggs for sale, found one morning, 9; next morning, 8; next morning, 11; next morning, 12; next morning, 7. How many had she in all?

In one class of a school, there are 9 pupils; in another, 12; in another, 8; in another, 13: how many in all?

In a school, there are 29 girls, and 19 boys: how many pupils?

In one town, 37 teachers are employed; in another, 12: how many in both?

One man had 25 chickens; his next neighbor had 18: how many had both?

A tavern-keeper went to market, and bought 19 pounds of beef, 9 pounds of veal, 13 pounds of mutton, and 8 pounds of lamb: how many pounds did all the meat weigh?

George answered correctly 15 questions in arithmetic, 17 in grammar, and 16 in geography: how many in all?

Reproduce.

CXLVII.

Count backward by twos from 49 to 1, 48 to 2.

Write the following groups of numbers, with amounts or differences as the case may be:

FORM: $29 + 1 = 30$ $26 + 2 = 28$
 $30 - 1 = 29$ $28 - 2 = 26$
 $30 - 29 = 1$ $28 - 26 = 2$

Add 39 and 1; 40 and 1; 41 and 1; 42 and 1; 43 and 1; 44 and 1; 45 and 1; 46 and 1; 47 and 1; 48 and 1.

Take 1 from 49; 1 from 48; 1 from 47; 1 from 46; 1 from 45; 1 from 44; 1 from 43; 1 from 42; 1 from 41; 1 from 40.

Add 38 and 2; 40 and 2; 42 and 2; 44 and 2; 46 and 2; 39 and 2; 41 and 2; 43 and 2; 45 and 2; 47 and 2.

Take 2 from 49; 2 from 47; 2 from 45; 2 from 43; 2 from 41; 2 from 48; 2 from 46; 2 from 44; 2 from 42; 2 from 40.

Add 37 and 3; 40 and 3; 43 and 3; 46 and 3; 38 and 3; 41 and 3; 44 and 3; 39 and 3; 42 and 3; 45 and 3.

Take 3 from 49; 3 from 46; 3 from 43; 3 from 40; 3 from 48; 3 from 45; 3 from 42; 3 from 47; 3 from 44; 3 from 41.

Drill as in Exercise LXXXVI.

CXLVIII.

Count backward by threes from 49 to 1, 48 to 3, 47 to 2.

Write as in Exercise CXLVII.

Add 36 and 4; 40 and 4; 44 and 4; 37 and 4; 41 and 4; 45 and 4; 38 and 4; 42 and 4; 39 and 4; 43 and 4.

Take 4 from 49; 4 from 45; 4 from 41; 4 from 48; 4 from 44; 4 from 40; 4 from 47; 4 from 43; 4 from 46; 4 from 42.

Add 35 and 5; 40 and 5; 36 and 5; 41 and 5; 37 and 5; 42 and 5; 38 and 5; 43 and 5; 39 and 5; 44 and 5.

Take 5 from 49; 5 from 44; 5 from 48; 5 from 43; 5 from 47; 5 from 42; 5 from 46; 5 from 41; 5 from 45; 5 from 40.

Add 34 and 6; 40 and 6; 35 and 6; 41 and 6; 36 and 6; 42 and 6; 37 and 6; 43 and 6; 38 and 6; 39 and 6.

Take 6 from 49; 6 from 43; 6 from 48; 6 from 42; 6 from 47; 6 from 41; 6 from 46; 6 from 40; 6 from 45; 6 from 44.

Drill as in Exercise LXXXVI.

CXLIX.

Count backward by fours from 49 to 1, 48 to 4, 47 to 3, 46 to 2.

Write as in Exercise CXLVII.

Add 33 and 7; 40 and 7; 34 and 7; 41 and 7; 35 and 7; 42 and 7; 36 and 7; 37 and 7; 38 and 7; 39 and 7.

Take 7 from 49; 7 from 42; 7 from 48; 7 from 41; 7 from 47; 7 from 40; 7 from 46; 7 from 45; 7 from 44; 7 from 43.

Add 32 and 8; 40 and 8; 33 and 8; 41 and 8; 34 and 8; 35 and 8; 36 and 8; 37 and 8; 38 and 8; 39 and 8.

Take 8 from 49; 8 from 41; 8 from 48; 8 from 40; 8 from 47; 8 from 46; 8 from 45; 8 from 44; 8 from 43; 8 from 42.

Add 31 and 9; 40 and 9; 32 and 9; 33 and 9; 34 and 9; 35 and 9; 36 and 9; 37 and 9; 38 and 9; 39 and 9.

Take 9 from 49; 9 from 40; 9 from 48; 9 from 47; 9 from 46; 9 from 45; 9 from 44; 9 from 43; 9 from 42; 9 from 41.

Drill as in Exercise LXXXVI.

CL.

Count backward by fives from 49 to 4, 48 to 3, 47 to 2, 46 to 1, 45 to 5.

Write as in Exercise CXLVII.

Add 4 and 45; 4 and 43; 4 and 41; 4 and 39; 4 and 37;

4 and 44; 4 and 42; 4 and 40; 4 and 38; 4 and 36; 8 and 41; 8 and 39; 8 and 37; 8 and 35; 8 and 33; 8 and 40; 8 and 38; 8 and 36; 8 and 34; 8 and 32; 3 and 46; 3 and 44; 3 and 42; 3 and 40; 3 and 38; 3 and 45; 3 and 43; 3 and 41; 3 and 39; 3 and 37.

Take 4 from 49; 4 from 47; 4 from 45; 4 from 43; 4 from 41; 4 from 48; 4 from 46; 4 from 44; 4 from 42; 4 from 40; 8 from 49; 8 from 47; 8 from 45; 8 from 43; 8 from 41; 8 from 48; 8 from 46; 8 from 44; 8 from 42; 8 from 40; 3 from 49; 3 from 47; 3 from 45; 3 from 43; 3 from 41; 3 from 48; 3 from 46; 3 from 44; 3 from 42; 3 from 40.

Drill as in Exercise LXXXVI.

CLI.

Count backward by sixes from 49 to 1, 48 to 6, 47 to 5, 46 to 4, 45 to 3, 44 to 2.

Write as in Exercise CXLVII.

Add 7 and 42; 7 and 40; 7 and 38; 7 and 36; 7 and 34; 7 and 41; 7 and 39; 7 and 37; 7 and 35; 7 and 33; 2 and 47; 2 and 45; 2 and 43; 2 and 41; 2 and 39; 2 and 46; 2 and 44; 2 and 42; 2 and 40; 2 and 38; 6 and 43; 6 and 41; 6 and 39; 6 and 37; 6 and 35; 6 and 42; 6 and 40; 6 and 38; 6 and 36; 6 and 34.

Take 7 from 49; 7 from 47; 7 from 45; 7 from 43; 7 from 41; 7 from 48; 7 from 46; 7 from 44; 7 from 42; 7 from 40; 2 from 49; 2 from 47; 2 from 45; 2 from 43; 2 from 41; 2 from 48; 2 from 46; 2 from 44; 2 from 42; 2 from 40; 6 from 49; 6 from 47; 6 from 45; 6 from 43; 6 from 41; 6 from 48; 6 from 46; 6 from 44; 6 from 42; 6 from 40.

Drill as in Exercise LXXXVI.

CLII.

Count backward by sevens from 49 to 7, 48 to 6, 47 to 5, 46 to 4, 45 to 3, 44 to 2, 43 to 1.

Write as in Exercise CXLVII.

Add 1 and 48; 1 and 46; 1 and 44; 1 and 42; 1 and 40; 1 and 47; 1 and 45; 1 and 43; 1 and 41; 1 and 39; 9 and 40; 9 and 38; 9 and 36; 9 and 34; 9 and 32; 9 and 39; 9 and 37; 9 and 35; 9 and 33; 9 and 31; 5 and 44; 5 and 42; 5 and 40; 5 and 38; 5 and 36; 5 and 43; 5 and 41; 5 and 39; 5 and 37; 5 and 35.

Take 1 from 49; 1 from 47; 1 from 45; 1 from 43; 1 from 41; 1 from 48; 1 from 46; 1 from 44; 1 from 42; 1 from 40; 9 from 49; 9 from 47; 9 from 45; 9 from 43; 9 from 41; 9 from 48; 9 from 46; 9 from 44; 9 from 42; 9 from 40; 5 from 49; 5 from 47; 5 from 45; 5 from 43; 5 from 41; 5 from 48; 5 from 46; 5 from 44; 5 from 42; 5 from 40.

Drill as in Exercise LXXXVI.

CLIII.

Write the following subtractions, the subtrahend underneath the minuend, and below them a straight line, with the remainder under that.

48—39	48—29	48—19	47—39	47—29
47—19	47—38	47—28	47—18	46—39
46—29	46—19	46—38	46—28	46—18
46—37	46—27	46—17	45—39	45—29
45—19	45—38	45—28	45—18	45—37
45—27	45—17	45—36	45—26	45—16
44—39	44—29	44—19	44—38	44—28
44—18	44—37	44—27	44—17	44—36
44—26	44—16	44—35	44—25	44—15
43—39	43—29	43—19	43—38	43—28

43—18	43—37	43—27	43—17	43—36
43—26	43—16	43—35	43—25	43—15
43—34	43—24	43—14	43—4	43—3

Drill as in Exercise XCIV.

CLIV.

Write as in Exercise CLII.

42—39	42—29	42—19	42—38	42—28
42—18	42—37	42—27	42—17	42—36
42—26	42—16	42—35	42—25	42—15
42—34	42—24	42—14	42—33	42—23
42—13	41—39	41—29	41—19	41—38
41—28	41—18	41—37	41—27	41—17
41—36	41—26	41—16	41—35	41—25
41—15	41—34	41—24	41—14	41—33
41—23	41—13	41—32	41—22	41—12
40—39	40—29	40—19	40—38	40—28
40—18	40—37	40—27	40—17	40—36
40—26	40—16	40—35	40—25	40—15
40—34	40—24	40—14	40—33	40—23
40—13	40—32	40—22	40—12	40—31
40—21	40—11	40—1	40—20	40—10

Drill as in Exercise XCIV.

CLV.

Mental.

Mr. Franklin is 44 years of age, and his son 19: how much older is the father than the son?

In an orchard are 45 apple-trees, 37 pear-trees, 28 peach-trees, 19 plum-trees, 16 cherry-trees: how many more apple-trees than pear-trees? Than peach-trees? Than plum-trees? Than cherry-trees?—How many more pear-trees than peach-trees? Than plum-trees? Than cherry-trees?—How many more peach-trees than plum-trees? Than

cherry-trees? — How many more plum-trees than cherry-trees? — How many less cherry-trees than plum-trees? Than peach-trees? Than pear-trees? Than apple-trees? — How many less plum-trees than peach-trees? Than pear-trees? Than apple-trees? — How many less peach-trees than pear-trees? Than apple-trees? — How many less pear-trees than apple-trees? — One year they all bore fruit; but in another season only 22 apple-trees, 28 pear-trees, 16 peach-trees, 14 plum-trees, and 9 cherry-trees yielded fruit: how many of each kind failed in the latter year?

A shoemaker has 49 pairs of shoes in his store: after awhile he finds he has sold 13 pairs; afterward, 18 pairs. He then made 15 pairs more. He afterward sold 19 pairs. How many pairs had he then left?

Reproduce.

CLVI.

Write the following multiplications, in a neat table:

FORM: $1 \times 2 = 2$

$1 \times 3 = 3$

2 times 1 are how many? 3 times 1? 4 times 1? 5 times 1? 6 times 1? 7 times 1? 8 times 1? 9 times 1? 10 times 1? 11 times 1? 12 times 1? •

2 times 2 are how many? 3 times 2? 4 times 2? 5 times 2? 6 times 2? 7 times 2? 8 times 2? 9 times 2? 10 times 2? 11 times 2? 12 times 2?

2 times 3 are how many? 3 times 3? 4 times 3? 5 times 3? 6 times 3? 7 times 3? 8 times 3? 9 times 3? 10 times 3? 11 times 3? 12 times 3?

2 times 4 are how many? 3 times 4? 4 times 4? 5 times 4? 6 times 4? 7 times 4? 8 times 4? 9 times 4? 10 times 4? (Add 10 Fours.) 11 times 4? (Add 11 Fours.) 12 times 4? (Add 12 Fours.)

Drill as in Exercise C.

CLVII.

Write as in Exercise CLVI.

2 times 5 are how many? 3 times 5? 4 times 5? 5 times 5? 6 times 5? 7 times 5? 8 times 5? (Add 8 Fives.) 9 times 5? (Add 9 Fives.)

2 times 6 are how many? 3 times 6? 4 times 6? 5 times 6? 6 times 6? 7 times 6? (Add 7 Sixes.) 8 times 6? (Add 8 Sixes.)

2 times 7 are how many? 3 times 7? 4 times 7? 5 times 7? 6 times 7? (Add 6 Sevens.) 7 times 7? (Add 7 Sevens.)

2 times 8 are how many? 3 times 8? 4 times 8? 5 times 8? (Add 5 Eights.) 6 times 8? (Add 6 Eights.)

2 times 9 are how many? 3 times 9? 4 times 9? 5 times 9? (Add 5 Nines.)

2 times 10 are how many? 3 times 10? 4 times 10? (Add 4 Tens.)

2 times 11 are how many? 3 times 11? 4 times 11? (Add 4 Elevens.)

2 times 12 are how many? 3 times 12? 4 times 12? (Add 4 Twelves.)

6×6	7×7	6×8	7×6	8×6	5×9
5×7	5×8	9×5	8×5	10×4	4×11
12×4	11×4	4×12	9×4	8×4	7×4

Drill as in Exercise C.

CLVIII.

Mental.

If a horse car is drawn 6 miles an hour, how many miles will it be drawn in 8 hours? In 7 hours? In 6 hours? In 5 hours? In 4 hours? In 3 hours? In 2 hours?

If a workman earns 3 dollars in a day, how many dollars will he earn in 12 days? In 11 days? In 10 days? In 9

days? In 8 days? In 7 days? In 6 days? In 5 days? In 4 days? In 3 days? In 2 days?—If he earns 4 dollars a day, then how many in 12 days? In 11? In 10? In 9? In 8? In 7? In 6? In 5? In 4? In 3? In 2?—If he earns 5 dollars a day, how many in 9 days? In 8? In 7? In 6? In 5? In 4? In 3? In 2?—If 6 dollars a day, then how many in 8 days? In 7? In 6? In 5? In 4? In 3? In 2?

12 pence make 1 shilling: how many pence in 4 shillings? In 3 shillings? In 2 shillings?

If 7 men do a piece of work in 5 days, in how many days can 1 man do it? If it takes the 7 men 6 days? If 4 days? If 7 days?

Reproduce.

CLIX.

Write the following divisions:

$$\begin{array}{l} \text{FORM:} \quad 4 \div 2 = 2 \\ \quad \quad 10 \div 5 = 2 \\ \quad \quad 16 \div 4 = 4 \end{array}$$

How many times is 2 contained in 24? in 22? in 20? in 18? in 16? in 14? in 12? in 10? in 8? in 6? in 4? in 2?

3, in 36? in 33? in 30? in 27? in 24? in 21? in 18? in 15? in 12? in 9? in 6? in 3?

4, in 48? in 44? in 40? in 36? in 32? in 28? in 24? in 20? in 16? in 12? in 8? in 4?

5, in 45? in 40? in 35? in 30? in 25? in 20? in 15? in 10? in 5?

Drill as in Exercise CIII.

CLX.

Write as in Exercise CLIX.

How many times is 6 contained in 48? in 42? in 36? in 30? in 24? in 18? in 12? in 6?

- 7, in 49? in 42? in 35? in 28? in 21? in 14? in 7?
 8, in 48? in 40? in 32? in 24? in 16? in 8?
 9, in 45? in 36? in 27? in 18? in 9?
 10, in 40? in 30? in 20? in 10?
 11, in 44? in 33? in 22? in 11?
 12, in 48? in 36? in 24? in 12?

Drill as in Exercise CIII.

CLXI.

Write the following divisions, the dividend above the divisor, and a line drawn between them.

FORM: $\frac{4}{2} = 2.$

$\frac{10}{5} = 2.$

$\frac{16}{4} = 4.$

Divide 49 by 7; 48 by 4; 48 by 6; 48 by 8; 48 by 12;
 45 by 5; 45 by 9; 44 by 4; 44 by 11; 42 by 6; 42 by 7;
 40 by 4; 40 by 10; 40 by 5; 40 by 8; 36 by 3; 36 by 4;
 36 by 6; 36 by 9; 36 by 12; 35 by 5; 35 by 7; 33
 by 3; 33 by 11; 32 by 4; 32 by 8; 30 by 5; 30 by 6;
 28 by 4; 28 by 7; 25 by 5; 27 by 3; 27 by 9; 24 by 2;
 24 by 3; 24 by 4; 24 by 6; 24 by 8; 24 by 12; 22 by 2;
 22 by 11; 21 by 3; 21 by 7; 20 by 2; 20 by 4; 20 by 5;
 20 by 10; 18 by 2; 18 by 3; 18 by 6; 18 by 9; 16 by 2;
 16 by 4; 16 by 8.

Drill as in Exercise CIII.

CLXII.

Mental.

It takes 3 feet to make a yard: which then is the longer, a yard or a foot? How many yards in 36 feet? In 6 feet? In 33 feet? In 9? In 30? In 12? In 27? In 15? In 24? In 18? In 21?

12 inches make a foot: which is the longer, a foot or an inch? Of which are there more in a given distance? How many feet in 48 inches? In 24? In 36?

There are 2 oxen in a yoke of oxen: how many yoke will 24 oxen make? Will 4 oxen make? Will 22 oxen? Will 6? 20? 8? 18? 10? 16? 12? 14?

Which is the longer, a day, a week, or a month? Are there more days, or more weeks, in a month? Fewer weeks, or fewer days? In 28 days, how many weeks, there being 7 days in each week? In 14 days? In 21 days? In 49 days? In 42 days? In 35 days? Name the days of the week.

At 10 cents a loaf of bread, how many loaves may be bought for 40 cents? For 20 cents? For 30 cents?

If a steamboat goes at the rate of 9 miles an hour, in how many hours will it go 45 miles? 36 miles? 27 miles? 18 miles?

How many barrels of flour may be bought for 48 dollars, at 12 dollars a barrel? How many for 36 dollars? For 24 dollars? — How many for 49 dollars, at 7 dollars a barrel?

Reproduce.

CHAPTER THE SIXTH.

Fifty to Fifty-nine.

CLXIII.

30. $49 + 1 = 40 + (9 + 1) = 40 + 10 = 4 \text{ Tens} + 1 \text{ Ten} = 5 \text{ Tens}$. For 5 Tens, we write 5 in the second place, thus, 50, which we read *Fifty*. $50 + 1$, we write 51, the 5 being *Fifty*, the 1, *One*. We use a capital L to represent 50, and represent the numbers following, to 59, by adding to the L the proper letters for the units.

Write the following table upon the blackboard :

Fifty = 5 Tens + Nothing,	L	50
Fifty-one = 5 Tens + One,	LI	51
Fifty-two = 5 Tens + Two,	LII	52
Fifty-three = 5 Tens + Three,	LIII	53
Fifty-four = 5 Tens + Four,	LIV	54
Fifty-five = 5 Tens + Five,	LV	55
Fifty-six = 5 Tens + Six,	LVI	56
Fifty-seven = 5 Tens + Seven,	LVII	57
Fifty-eight = 5 Tens + Eight,	LVIII	58
Fifty-nine = 5 Tens + Nine,	LIX	59

Drill as in Exercise XXXVI.

CLXIV.

Read the following numbers :

20 ; 27 ; 39 ; 50 ; 43 ; 30 ; 25 ; 51 ; 23 ; 40 ; 21 ; 52 ;
 38 ; 36 ; 47 ; 53 ; 22 ; 24 ; 37 ; 54 ; 41 ; 26 ; 35 ; 55 ; 49 ;
 34 ; 28 ; 56 ; 42 ; 31 ; 33 ; 57 ; 29 ; 45 ; 32 ; 58 ; 44 ; 48 ;
 59 ; 46. L, XLIII, LI, XL, LII, XLVII, LIII, LIV,
 XLI, LV, XLIX, LVI, XLII, LVII, XLV, LVIII, XLIV,
 XLVIII, LIX, XLVI.

Drill as in Exercise XXXVII. What does 5 stand for in the first place?
 in the second? 4? 3? 2? 1?

CLXV.

Write the following numbers in letters and figures :

Thirty ; Forty ; Fifty ; Thirty-one ; Forty-one ; Fifty-
 one ; Thirty-two ; Forty-two ; Fifty-two ; Thirty-three ;
 Forty-three ; Fifty-three ; Thirty-four ; Forty-four ; Fifty-
 four ; Thirty-five ; Forty-five ; Fifty-five ; Thirty-six ; Forty-
 six ; Fifty-six ; Thirty-seven ; Forty-seven ; Fifty-seven ;
 Thirty-eight ; Forty-eight ; Fifty-eight ; Thirty-nine ; Forty-
 nine ; Fifty-nine.

Continue the exercise, until each pupil writes neatly and promptly every
 number up to 59. Read and analyze.

CLXVI.

Count from 1 to 59, forward and backward.

Write the following additions :

$$\text{FORM: } 11 + 3 = 14$$

$$17 + 2 = 19$$

$$14 + 4 = 18$$

Add 49 and 1; 50 and 1; 51 and 1; 52 and 1; 53 and 1; 54 and 1; 55 and 1; 56 and 1; 57 and 1; 58 and 1; 48 and 2; 50 and 2; 52 and 2; 54 and 2; 56 and 2; 49 and 2; 51 and 2; 53 and 2; 55 and 2; 57 and 2; 47 and 3; 50 and 3; 53 and 3; 56 and 3; 48 and 3; 51 and 3; 54 and 3; 49 and 3; 52 and 3; 55 and 3; 46 and 4; 50 and 4; 54 and 4; 47 and 4; 51 and 4; 55 and 4; 48 and 4; 52 and 4; 49 and 4; 53 and 4.

Drill as in Exercise CX.

CLXVII.

Count by twos from 1 to 59, 2 to 58, and backward.

Write as in Exercise CLXVI.

Add 45 and 5; 50 and 5; 46 and 5; 51 and 5; 47 and 5; 52 and 5; 48 and 5; 53 and 5; 49 and 5; 54 and 5; 44 and 6; 50 and 6; 45 and 6; 51 and 6; 46 and 6; 52 and 6; 47 and 6; 53 and 6; 48 and 6; 49 and 6; 43 and 7; 50 and 7; 44 and 7; 51 and 7; 45 and 7; 52 and 7; 46 and 7; 47 and 7; 48 and 7; 49 and 7; 42 and 8; 50 and 8; 43 and 8; 51 and 8; 44 and 8; 45 and 8; 46 and 8; 47 and 8; 48 and 8; 49 and 8; 41 and 9; 50 and 9; 42 and 9; 43 and 9; 44 and 9; 45 and 9; 46 and 9; 47 and 9; 48 and 9; 49 and 9.

Drill as in Exercise CX.

CLXVIII.

Count by threes from 1 to 58, 2 to 59, 3 to 57, and backward.

Write as in Exercise CLXVI.

31 + 4	41 + 4	51 + 4	81 + 5	41 + 5
51 + 5	31 + 6	41 + 6	51 + 6	31 + 7
41 + 7	51 + 7	31 + 8	41 + 8	51 + 8
21 + 9	31 + 9	41 + 9	32 + 4	42 + 4
52 + 4	32 + 5	42 + 5	52 + 5	32 + 6
42 + 6	52 + 6	32 + 7	42 + 7	52 + 7
22 + 8	32 + 8	42 + 8	22 + 9	32 + 9
42 + 9	33 + 4	43 + 4	53 + 4	33 + 5
43 + 5	53 + 5	33 + 6	43 + 6	53 + 6
23 + 7	33 + 7	43 + 7	23 + 8	33 + 8
48 + 8	23 + 9	33 + 9	43 + 9	34 + 4
44 + 4	54 + 4	34 + 5	44 + 5	54 + 5
24 + 6	34 + 6	44 + 6	24 + 7	34 + 7
44 + 7	24 + 8	34 + 8	44 + 8	24 + 9
34 + 9	44 + 9	35 + 3	45 + 3	55 + 3

Drill as in Exercise CX.

CLXIX.

Count by fours from 1 to 57, 2 to 58, 3 to 59, 4 to 56, and backward.

Write as in Exercise CLXVI.

35 + 4	45 + 4	55 + 4	25 + 5	35 + 5
45 + 5	25 + 6	35 + 6	45 + 6	25 + 7
35 + 7	45 + 7	25 + 8	35 + 8	45 + 8
25 + 9	35 + 9	45 + 9	26 + 4	36 + 4
46 + 4	26 + 5	36 + 5	46 + 5	26 + 6
36 + 6	46 + 6	26 + 7	36 + 7	46 + 7
26 + 8	36 + 8	46 + 8	26 + 9	36 + 9
46 + 9	27 + 4	37 + 4	47 + 4	27 + 5

37 + 5	47 + 5	27 + 6	37 + 6	47 + 6
27 + 7	37 + 7	47 + 7	27 + 8	37 + 8
47 + 8	27 + 9	37 + 9	47 + 9	28 + 4
38 + 4	48 + 4	28 + 5	38 + 5	48 + 5
28 + 6	38 + 6	48 + 6	28 + 7	38 + 7
48 + 7	28 + 8	38 + 8	48 + 8	28 + 9
38 + 9	48 + 9	29 + 4	39 + 4	49 + 4
29 + 5	39 + 5	49 + 5	29 + 6	39 + 6
49 + 6	29 + 7	39 + 7	49 + 7	29 + 8
39 + 8	49 + 8	29 + 9	39 + 9	49 + 9

Drill as in Exercise CX.

CLXX.

Count by fives 1 to 56, 2 to 57, 3 to 58, 4 to 59, 5 to 55, and backward.

Write the following numbers, in columns, the amount below, separated by a line.

3 + 4 + 5 + 6 + 7 + 8	4 + 5 + 6 + 7 + 8 + 9
5 + 6 + 7 + 8 + 9 + 9	6 + 7 + 8 + 9 + 9 + 9
7 + 8 + 9 + 9 + 9 + 9	8 + 9 + 9 + 9 + 9 + 9
9 + 9 + 9 + 9 + 9 + 9	8 + 8 + 8 + 8 + 8 + 8
7 + 7 + 7 + 7 + 7 + 7	3 + 6 + 8 + 4 + 5 + 9
3 + 7 + 9 + 3 + 7 + 4	3 + 8 + 9 + 4 + 7 + 5
3 + 9 + 5 + 7 + 4 + 8	4 + 5 + 8 + 4 + 3 + 9
4 + 6 + 8 + 7 + 7 + 5	4 + 7 + 7 + 8 + 8 + 9
4 + 8 + 6 + 7 + 4 + 6	4 + 9 + 8 + 5 + 3 + 4
5 + 5 + 6 + 6 + 7 + 7	5 + 6 + 5 + 6 + 5 + 6
5 + 7 + 6 + 6 + 8 + 8	5 + 8 + 7 + 5 + 6 + 9
5 + 9 + 6 + 8 + 7 + 7	6 + 8 + 7 + 9 + 5 + 7
6 + 9 + 8 + 6 + 4 + 8	7 + 6 + 4 + 7 + 8 + 7
7 + 9 + 5 + 8 + 7 + 9	8 + 9 + 5 + 6 + 4 + 8
7 + 7 + 6 + 9 + 9 + 3	5 + 6 + 9 + 3 + 2 + 9
9 + 5 + 7 + 8 + 5 + 8	3 + 9 + 8 + 7 + 6 + 7

Drill as in Exercise CXV.

CLXXI.

Count by sixes 1 to 55, 2 to 56, 3 to 57, 4 to 58, 5 to 59, 6 to 54, and backward.

Write as in Exercise CLXX.

$$12 + 23 + 14 + 8$$

$$15 + 16 + 15 + 13$$

$$10 + 27 + 12 + 10$$

$$13 + 17 + 16 + 13$$

$$17 + 17 + 13 + 8$$

$$15 + 14 + 17 + 11$$

$$14 + 17 + 18 + 8$$

$$10 + 27 + 12 + 7$$

$$16 + 12 + 19 + 9$$

$$14 + 15 + 18 + 5$$

$$17 + 11 + 20 + 7$$

$$12 + 15 + 15 + 15$$

$$13 + 13 + 13 + 13$$

$$14 + 14 + 18 + 11$$

$$16 + 16 + 16 + 2$$

$$13 + 14 + 15 + 13$$

$$15 + 16 + 17 + 10$$

$$6 + 9 + 29 + 7$$

$$17 + 12 + 18 + 11$$

$$11 + 19 + 19 + 8$$

$$12 + 24 + 8 + 14$$

$$14 + 15 + 18 + 12$$

$$16 + 6 + 23 + 12$$

$$5 + 15 + 27 + 10$$

$$13 + 13 + 17 + 15$$

$$21 + 16 + 12 + 6$$

$$17 + 14 + 15 + 13$$

$$16 + 16 + 15 + 4$$

$$13 + 17 + 14 + 14$$

$$14 + 14 + 14 + 14$$

$$17 + 16 + 8 + 16$$

$$14 + 24 + 10 + 5$$

$$12 + 12 + 19 + 12$$

$$14 + 15 + 16 + 5$$

$$12 + 14 + 15 + 17$$

$$15 + 18 + 17 + 9$$

Drill as in Exercise CXVI.

CLXXII.

Mental.

An orchardist's son has laid by 6 pears of one kind, 5 of another, 8 of another, 7 of another, 9 of another, 4 of another, 12 of another, 5 of another: how many in all?

Mr. Tillman gave to a Hospital 15 dollars; to an Industrial School 17 dollars; to an Asylum 25 dollars: how many dollars does he give to all three?

A dairyman obtains milk on different days of different weeks, to the following number of gallons : how many gallons does he get in either week ? How many on the Mondays ? On the Tuesdays ? Wednesdays ? Thursdays ? Fridays ? Saturdays ? Sundays ?

	1st week.	2d wk.	3d wk.	4th wk.	5th wk.	6th wk.	7th wk.
Monday	8	7	8	9	10	9	8
Tuesday	9	9	8	9	9	7	6
Wednesday	7	9	8	8	7	9	8
Thursday	8	8	9	9	11	10	9
Friday	6	5	9	12	7	8	7
Saturday	11	9	7	5	7	9	8
Sunday	10	9	7	6	7	7	7

A laundress washes and irons for a gentleman in different weeks the following number of pieces of clothing . 5, 8, 7, 9, 8, 6, 8, 7 ; how many pieces in the 8 weeks ?

Reproduce.

CLXXIII.

Count by sevens 1 to 57, 2 to 58, 3 to 59, 4 to 53, 5 to 54, 6 to 55, 7 to 56, and backward.

Write the following subtractions, the subtrahend underneath the minuend, and below them a straight line, with the remainder under that.

59 — 49	59 — 39	59 — 29	59 — 19	59 — 58
59 — 48	59 — 38	59 — 28	59 — 18	59 — 57
59 — 47	59 — 37	59 — 27	59 — 17	59 — 56
59 — 46	59 — 36	59 — 26	59 — 16	59 — 55
59 — 45	59 — 35	59 — 25	59 — 15	59 — 54
59 — 44	59 — 34	59 — 24	59 — 14	59 — 53
59 — 43	59 — 33	59 — 23	59 — 13	59 — 52
59 — 42	59 — 32	59 — 22	59 — 12	59 — 51

59—41	59—31	59—21	59—11	59—50
59—40	59—30	59—20	58—49	58—39
58—29	58—19	58—48	58—38	58—28
58—18	58—57	58—47	58—37	58—27
58—17	58—56	58—46	58—36	58—26
58—16	58—55	58—45	58—35	58—25
58—54	58—44	58—34	58—24	58—53
58—43	58—33	58—23	58—52	58—42
58—32	58—22	58—51	58—41	58—31
58—21	58—50	58—40	58—30	58—20

Drill as in Exercise XCIV.

CLXXIV.

Count by eights 1 to 57, 2 to 58, 3 to 59, 4 to 52, 5 to 53, 6 to 54, 7 to 55, 8 to 56, and backward.

Write the following, as in Exercise CLXXIII.

57—49	57—39	57—29	57—48	57—38
57—28	57—47	57—37	57—27	57—26
57—36	57—46	57—45	57—35	57—25
57—44	57—34	57—24	57—43	57—33
57—23	57—42	57—32	57—22	57—41
57—31	57—21	57—40	57—30	57—20
56—49	56—39	56—29	56—48	56—38
56—28	56—47	56—37	56—27	56—46
56—36	56—26	56—45	56—35	56—25
56—34	56—44	56—24	56—43	56—33
56—23	56—42	56—32	56—22	56—31
56—41	56—21	56—40	56—30	56—20
55—39	55—29	55—38	55—28	55—37
55—27	55—36	55—26	55—35	55—25
55—34	55—24	55—33	55—23	55—32
55—22	55—31	55—21	55—30	55—20

Drill as in Exercise XCIV.

CLXXV.

Write as in Exercise CLXXIII.

54 — 39	54 — 29	54 — 38	54 — 28	54 — 37
54 — 27	54 — 36	54 — 26	54 — 35	54 — 25
54 — 34	54 — 24	54 — 33	54 — 23	54 — 32
54 — 22	54 — 31	54 — 21	54 — 30	54 — 20
53 — 39	53 — 29	53 — 38	53 — 28	53 — 37
53 — 27	53 — 36	53 — 26	53 — 35	53 — 25
53 — 34	53 — 24	53 — 33	53 — 23	53 — 32
53 — 22	53 — 31	53 — 21	53 — 30	53 — 20
52 — 39	52 — 29	52 — 38	52 — 28	52 — 37
52 — 27	52 — 36	52 — 26	52 — 35	52 — 25

Drill as in Exercise XCIV.

CLXXVI.

Write as in Exercise CLXXIII.

52 — 34	52 — 24	52 — 33	52 — 23	52 — 32
52 — 22	52 — 31	52 — 21	52 — 30	52 — 20
51 — 39	51 — 29	51 — 38	51 — 28	51 — 37
51 — 27	51 — 36	51 — 26	51 — 35	51 — 25
51 — 34	51 — 24	51 — 33	51 — 23	51 — 32
51 — 22	51 — 31	51 — 21	51 — 30	51 — 20
50 — 39	50 — 29	50 — 38	50 — 28	50 — 37
50 — 27	50 — 36	50 — 26	50 — 35	50 — 25
50 — 34	50 — 24	50 — 33	50 — 23	50 — 32
50 — 22	50 — 31	50 — 21	50 — 30	50 — 20

Drill as in Exercise XCV

CLXXVII.

Mental.

From a piece of muslin containing 59 yards, a merchant sold 9 yards: how many yards of the piece were left?

When he had sold 8 yards more, how many yards were left? When he had sold 9 yards more? 11 yards more? 14 yards more?

A fruit-dealer bought some apples for 8 dollars; some prunes for 7 dollars; some pears for 9 dollars; some oranges for 15 dollars; and sold them for 58 dollars in all: how much did he gain?

From the sum of 15 and 27, take 19; to the difference add 29; from this sum, take the difference between 48 and 29; from this difference, take 24: what remains?

A drover bought cattle as follows: on one day, 6; on another, 7; on another, 5; on another, 9; on another, 8; on another, 7; on another, 9; on another, 6. He sold to one man, 3; to another, 9; to another, 4; to another, 8; to another, 5; to another, 7; to another, 6. How many had he purchased? How many had he sold? How many had he still remaining?

If I am 53 years of age, and one son is 30, another is 27, another, 25; another, 22, how much older am I than each of my sons?

Reproduce.

CLXXVIII.

Repeat the multiplications in Exercise CLVI., by writing and by drill.

CLXXIX.

Write the following multiplications, in a neat table:

FORM: $1 \times 2 = 2$

$1 \times 3 = 3$

$1 \times 4 = 4$

2 times 5 are how many? 3 times 5? 4 times 5? 5 times 5? 6 times 5? 7 times 5? 8 times 5? 9 times 5? 10 times 5? (Add 10 Fives.) 11 times 5? (Add 11 Fives.)

2 times 6? 3 times 6? 4 times 6? 5 times 6? 6 times 6?
7 times 6? 8 times 6? 9 times 6? (Add 9 Sixes.)

2 times 7? 3 times 7? 4 times 7? 5 times 7? 6 times 7?
7 times 7? 8 times 7? (Add 8 Sevens.)

2 times 8? 3 times 8? 4 times 8? 5 times 8? 6 times 8?
7 times 8? (Add 7 Eights.)

2 times 9? 3 times 9? 4 times 9? 5 times 9? 6 times 9?
(Add 6 Nines.)

2 times 10? 3 times 10? 4 times 10? 5 times 10? (Add
5 Tens.)

2 times 11? 3 times 11? 4 times 11? 5 times 11? (Add
5 Elevens.)

2 times 12? 3 times 12? 4 times 12?

Drill as in Exercise C.

CLXXX.

Write as in Exercise CLXXIX.

How many are 2 times 13? 2 times 14? 15? 16? 17?
18? 19? 20? 21? 22? 23? 24? 25? 26? 27? 28? 29?

3 times 13? 14? 15? 16? 17? 18? 19?

4 times 13? 14?

13 times 2? 13 times 3? 13 times 4?

14 times 2? 14 times 3? 14 times 4?

15 times 2? 15 times 3? 16 times 2? 16 times 3?

17 times 2? 17 times 3? 18 times 2? 18 times 3?

19 times 2? 19 times 3? 20 times 2? 21 times 2?

22 times 2? 23 times 2? 24 times 2? 25 times 2?

26 times 2? 27 times 2? 28 times 2? 29 times 2?

Drill as in Exercise C.

CLXXXI.

Mental.

There are 10 cents in a dime, and 10 dimes in a dollar:
how many cents in 5 dimes? in 4 dimes? in 3 dimes? in 2

dimes? How many dimes in 5 dollars? in 4 dollars? in 3 dollars? in 2 dollars?

At 9 cents a quart, how many cents will 6 quarts of milk cost? 5 quarts? 4 quarts? 3? 2?

From 8×6 , take 4×7 . From 8×6 , take $25 - 9$. From 8×6 , take $45 \div 5$. To 6×6 , add $6 + 6$. To 8×6 , add $5 + 6$, take $24 - 9$, divide by 4.

If Elsie attends school 5 days in each week, how many days does she attend in 11 weeks? in 10 weeks? in 9 weeks? in 8? in 7? in 6? in 5? in 4? in 3? in 2?

Sometimes we reckon 12 ounces to the pound: how many ounces then in 4 pounds? in 3 pounds? in 2 pounds? Sometimes we reckon 16 ounces to the pound: how many ounces then in 3 pounds? in 2 pounds?

There are 4 pecks to the bushel: how many pecks in 14 bushels? in 13 bushels? in 12? in 11? in 10? in 9? in 8? in 7? in 6? in 5? in 4? in 3? in 2?

How far will a stage, which runs 8 miles an hour, go in 7 hours? in 6 hours? in 5? in 4? in 3? in 2? If it runs 7 miles an hour, how far in 8 hours? in 7 hours? in 6? in 5? in 4? in 3? in 2? If it runs 6 miles an hour, how far in 9 hours? in 8 hours? in 7? in 6? in 5? in 4? in 3? in 2?

Reproduce.

CLXXXII

Write the following divisions:

$$\text{FORM: } 4 \div 2 = 2$$

$$10 \div 5 = 2$$

$$16 \div 4 = 4$$

How many times is 2 contained in 24? in 22? in 20? in 18? in 16? in 14? in 12? in 10? in 8? in 6? in 4? in 2?

3, in 36? in 33? in 30? in 27? in 24? in 21? in 18? in 15? in 12? in 9? in 6? in 3?

4, in 48? in 44? in 40? in 36? in 32? in 28? in 24? in 20? in 16? in 12? in 8? in 4?

5, in 55? in 50? in 45? in 40? in 35? in 30? in 25? in 20? in 15? in 10? in 5?

Drill as in Exercise CIII.

CLXXXIII.

Write as in Exercise CLXXXII.

How many times is 6 contained in 54? in 48? in 42? in 36? in 30? in 24? in 18? in 12? in 6?

7, in 56? in 49? in 42? in 35? in 28? in 21? in 14? in 7?

8, in 56? in 48? in 40? in 32? in 24? in 16? in 8?

9, in 54? in 45? in 36? in 27? in 18? in 9?

10, in 50? in 40? in 30? in 20? in 10?

11, in 55? in 44? in 33? in 22? in 11?

12, in 48? in 36? in 24? in 12?

Drill as in Exercise CIII.

CLXXXIV.

Write the following divisions, the dividend above the divisor, with a line drawn between.

FORM: $\frac{4}{2} = 2$, $\frac{10}{5} = 2$, $\frac{16}{4} = 4$.

Divide 56 by 7; 56 by 8; 55 by 5; 55 by 11; 54 by 6; 54 by 9; 50 by 5; 50 by 10; 49 by 7; 48 by 4; 48 by 6; 48 by 8; 48 by 12; 45 by 5; 45 by 9; 44 by 4; 44 by 11; 42 by 6; 42 by 7; 40 by 4; 40 by 10; 40 by 5; 40 by 8; 36 by 3; 36 by 12; 36 by 4; 36 by 9; 36 by 6; 35 by 5; 35 by 7; 33 by 3; 33 by 11; 32 by 4; 32 by 8; 30 by 3; 30 by 5; 30 by 6; 30 by 10; 28 by 4; 28 by 7; 27 by 3; 27 by 9; 25 by 5; 24 by 2; 24 by 3; 24 by 4; 24 by 6; 24 by 8; 24 by 12; 22 by 2; 22 by 11; 20 by 2; 20 by 4; 20 by 5; 20 by 10; 21 by 3; 21 by 7.

Drill as in Exercise CIII.

CLXXXV.

Write as in Exercise CLXXXIV.

Divide 58 by 2; 57 by 3; 56 by 2; 56 by 4; 55 by 5; 58 by 29; 57 by 19; 56 by 28; 56 by 14; 55 by 11; 54 by 2; 54 by 3; 52 by 2; 52 by 4; 51 by 3; 50 by 2; 48 by 2; 48 by 3; 54 by 27; 54 by 18; 52 by 26; 52 by 13; 51 by 17; 50 by 25; 48 by 24; 48 by 16; 46 by 2; 45 by 3; 44 by 2; 46 by 23; 45 by 15; 44 by 22; 42 by 2; 42 by 3; 40 by 2; 39 by 3; 38 by 2; 36 by 2; 34 by 2; 32 by 2; 30 by 2; 28 by 2; 26 by 2; 42 by 21; 42 by 14; 40 by 20; 39 by 13; 38 by 19; 36 by 18; 34 by 17; 32 by 16; 30 by 15; 28 by 14; 26 by 13.

Drill as in Exercise CIII.

CLXXXVI.

Mental.

In one foot there are 12 inches: 48 inches are how many feet? 36 inches are how many? 24 inches?

8 quarts are equal to 1 peck: how many pecks are there in 56 quarts? in 48 quarts? in 40 quarts? in 32 quarts?

Paid 50 dollars for a quantity of dry goods, at 5 dollars a yard: how many yards did I purchase?

One man owed another 57 dollars, and agreed to pay it in labor at 3 dollars per day: how many days did he have to work, in order to pay the debt?

In a school of 56 pupils, there are 4 classes of equal number: how many scholars in each class?

How many pounds of candles, weighing 6 to the pound, will 54 candles make? will 48 make? will 42? will 36? will 30? will 24? will 18? will 12?

A man had an estate with a front measuring 45 rods: into how many lots with a front of 9 rods each could he divide it? If the front measured 54 rods? If it measured 36 rods?

Reproduce.

CHAPTER THE SEVENTH.

Sixty to Sixty-nine.

CLXXXVII.

31. $59 + 1 = 50 + (9 + 1) = 50 + 10 = 5 \text{ Tens} + 1 \text{ Ten} = 6 \text{ Tens}$. For 6 Tens, we write 6 in the second place, thus 60, which we read *Sixty*. $60 + 1$, we write 61, the 6 being *Sixty*, the 1, *One*. We write 60, in letters, by adding the X for 10 to the L for 50, and represent the numbers following by adding the proper letters for the units.

Write the following table upon the blackboard :

Sixty = 6 Tens + Nothing,	LX	60
Sixty-one = 6 Tens + One,	LXI	61
Sixty-two = 6 Tens + Two,	LXII	62
Sixty-three = 6 Tens + Three,	LXIII	63
Sixty-four = 6 Tens + Four,	LXIV	64
Sixty-five = 6 Tens + Five,	LXV	65
Sixty-six = 6 Tens + Six,	LXVI	66
Sixty-seven = 6 Tens + Seven,	LXVII	67
Sixty-eight = 6 Tens + Eight,	LXVIII	68
Sixty-nine = 6 Tens + Nine,	LXIX	69

Drill as in Exercise XXXVI.

CLXXXVIII.

Read the following numbers :

30; 37; 49; 60; 53; 40; 35; 61; 33; 50; 31; 62; 48;
 46; 57; 63; 32; 34; 47; 64; 51; 36; 45; 65; 59; 44; 38;
 66; 52; 41; 43; 67; 39; 55; 42; 68; 54; 58; 69; 56;
 XLIX, LX, LIII, XL, LXI, L, LXII, XLVIII, XLVI,
 LVII, LXIII, XLVII, LXIV, LI, XLV, LXV, LIX,

XLIV, LXVI, LII, XLI, XLIII, LXVII, LV, XLII, LVI, LXVIII, LIV, LVIII, LXIX.

Drill as in Exercise XXXVII. What does 6 stand for in the second place? In the first? 5? 4? 3? 2? 1?

CLXXXIX.

Write the following numbers in letters and figures :

Fifty	Sixty	Fifty-one	Fifty-two
Sixty-two	Fifty-three	Sixty-three	Fifty-four
Sixty-four	Fifty-five	Sixty-five	Fifty-six
Sixty-six	Fifty-seven	Sixty-seven	Fifty-eight
Sixty-eight	Fifty-nine	Sixty-nine	Sixty-one

Vary and continue the exercise, until each pupil writes neatly and promptly every number up to 69. Read and analyze.

CXC.

Count 1 to 69 and backward.

Write the following additions.

$$\begin{array}{l} \text{FORM:} \quad 11 + 3 = 14 \\ \quad \quad 17 + 2 = 19 \\ \quad \quad 14 + 4 = 18 \end{array}$$

Add 59 and 1; 60 and 1; 61 and 1; 62 and 1; 63 and 1; 64 and 1; 65 and 1; 66 and 1; 67 and 1; 68 and 1; 58 and 2; 60 and 2; 62 and 2; 64 and 2; 66 and 2; 59 and 2; 61 and 2; 63 and 2; 65 and 2; 67 and 2; 57 and 3; 60 and 3; 63 and 3; 66 and 3; 58 and 3; 61 and 3; 64 and 3; 59 and 3; 62 and 3; 65 and 3; 56 and 4; 60 and 4; 64 and 4; 57 and 4; 61 and 4; 65 and 4; 58 and 4; 62 and 4; 59 and 4; 63 and 4; 55 and 5; 60 and 5; 56 and 5; 61 and 5; 57 and 5; 62 and 5; 58 and 5; 63 and 5; 59 and 5; 64 and 5.

Drill as in Exercise CX.

CXCI.

Count by twos, 1 to 69, 2 to 68, and backward.

Write as in Exercise CXC.

Add 54 and 6; 60 and 6; 55 and 6; 61 and 6; 56 and 6; 62 and 6; 57 and 6; 63 and 6; 58 and 6; 59 and 6; 53 and 7; 60 and 7; 54 and 7; 61 and 7; 55 and 7; 62 and 7; 56 and 7; 57 and 7; 58 and 7; 59 and 7; 52 and 8; 60 and 8; 53 and 8; 61 and 8; 54 and 8; 55 and 8; 56 and 8; 57 and 8; 58 and 8; 59 and 8; 51 and 9; 60 and 9; 52 and 9; 53 and 9; 54 and 9; 55 and 9; 56 and 9; 57 and 9; 58 and 9; 59 and 9.

Drill as in Exercise CX.

CXCI.

Count by threes, 1 to 67, 2 to 68, 3 to 69, and backward.

Write as in Exercise CXC.

50 + 1	60 + 1	51 + 1	61 + 1	52 + 1
62 + 1	53 + 1	63 + 1	54 + 1	64 + 1
55 + 1	65 + 1	56 + 1	66 + 1	57 + 1
67 + 1	58 + 1	68 + 1	59 + 1	50 + 2
51 + 2	61 + 2	52 + 2	62 + 2	53 + 2
63 + 2	54 + 2	64 + 2	55 + 2	60 + 2
56 + 3	65 + 2	56 + 2	66 + 2	57 + 2
67 + 2	58 + 2	59 + 2	65 + 4	50 + 3
60 + 3	51 + 3	61 + 3	52 + 3	62 + 3
53 + 3	63 + 3	54 + 3	64 + 3	55 + 3
65 + 3	66 + 3	57 + 3	58 + 3	59 + 3
50 + 4	60 + 4	51 + 4	61 + 4	52 + 4
62 + 4	53 + 4	63 + 4	54 + 4	64 + 4
55 + 4	56 + 4	57 + 4	58 + 4	59 + 4

Drill as in Exercise CX.

CXCIII.

Count by fours, 1 to 69, 2 to 66, 3 to 67, 4 to 68, and backward.

Write as in Exercise CXC.

50 + 5	60 + 5	51 + 5	61 + 5	52 + 5
62 + 5	53 + 5	63 + 5	54 + 5	64 + 5
55 + 5	56 + 5	57 + 5	58 + 5	59 + 5
50 + 6	60 + 6	51 + 6	61 + 6	52 + 6
62 + 6	53 + 6	63 + 6	54 + 6	55 + 6
56 + 6	57 + 6	58 + 6	59 + 6	50 + 7
60 + 7	51 + 7	61 + 7	52 + 7	62 + 7
53 + 7	54 + 7	55 + 7	56 + 7	57 + 7
58 + 7	59 + 7	50 + 8	60 + 8	51 + 8
61 + 8	52 + 8	53 + 8	54 + 8	55 + 8
56 + 8	57 + 8	58 + 8	59 + 8	50 + 9
60 + 9	51 + 9	52 + 9	53 + 9	54 + 9
55 + 9	56 + 9	57 + 9	58 + 9	59 + 9

Drill as in Exercise CX.

CXCIV.

Count by fives from 1 to 66, 2 to 67, 3 to 68, 4 to 69, 5 to 65, and backward.

Write the following numbers in columns, the amount below, separated by a line.

3 + 24 + 5 + 16 + 7 + 8
24 + 5 + 6 + 7 + 8 + 19
5 + 6 + 17 + 8 + 9 + 19
16 + 7 + 8 + 9 + 19 + 9
8 + 19 + 9 + 9 + 9 + 9
9 + 9 + 9 + 19 + 9 + 9
8 + 18 + 8 + 8 + 18 + 8
7 + 27 + 7 + 7 + 7 + 7

13 + 6 + 18 + 4 + 15 + 9
 13 + 7 + 9 + 13 + 7 + 14
 23 + 8 + 19 + 4 + 7 + 5
 13 + 9 + 15 + 7 + 14 + 8
 4 + 5 + 18 + 14 + 13 + 9
 4 + 16 + 8 + 17 + 7 + 15
 4 + 17 + 7 + 18 + 8 + 9
 4 + 8 + 16 + 17 + 14 + 6
 4 + 19 + 8 + 15 + 3 + 14
 5 + 15 + 6 + 16 + 17 + 7
 5 + 16 + 15 + 6 + 5 + 16
 5 + 17 + 6 + 6 + 8 + 18
 15 + 8 + 7 + 5 + 6 + 19
 5 + 9 + 16 + 8 + 7 + 17
 6 + 18 + 7 + 19 + 5 + 7
 6 + 9 + 8 + 16 + 14 + 8
 7 + 26 + 4 + 7 + 8 + 17
 7 + 9 + 15 + 8 + 7 + 19

Drill as in Exercise CXVI.

CXCV.

Count by sixes, 1 to 67, 2 to 68, 3 to 69, 4 to 64, 5 to 65, 6 to 66, and backward.

Write as in Exercise CXIV.

22 + 23 + 14 + 8	17 + 22 + 18 + 11
15 + 16 + 25 + 13	11 + 19 + 19 + 18
10 + 27 + 22 + 10	12 + 24 + 18 + 14
13 + 17 + 16 + 23	24 + 15 + 18 + 12
17 + 17 + 13 + 18	16 + 16 + 23 + 12
15 + 14 + 17 + 21	15 + 15 + 27 + 10
14 + 17 + 18 + 18	23 + 13 + 17 + 15
10 + 27 + 12 + 17	21 + 16 + 12 + 16
16 + 12 + 19 + 19	17 + 24 + 15 + 13

14 + 15 + 18 + 15
 17 + 11 + 20 + 17
 22 + 15 + 15 + 15
 15 + 15 + 15 + 15
 17 + 17 + 17 + 17
 16 + 6 + 6 + 32
 13 + 14 + 15 + 23
 15 + 16 + 17 + 20
 16 + 9 + 29 + 7

16 + 18 + 15 + 14
 13 + 17 + 14 + 24
 14 + 24 + 14 + 14
 16 + 16 + 16 + 16
 14 + 24 + 10 + 15
 12 + 12 + 29 + 12
 14 + 15 + 16 + 15
 12 + 24 + 15 + 17
 18 + 13 + 12 + 25

Drill as in Exercise CXVI.

CXCVI.

Mental.

Mr. Readyman bought at a furniture-store, a bureau worth 25 dollars; a table worth 18 dollars; a bedstead worth 15 dollars; and some chairs worth 9 dollars: how much did he expend in all?

If a merchant pays for an article 56 dollars, for how many dollars must he sell it, so that he shall gain 9 dollars?

A farmer has in one bin 15 bushels of grain; in another, 19 bushels; in another, 17 bushels; in another, 16 bushels: how many bushels has he in the four bins?

In a railway car there are seated on one side of the passage-way, 14 men and 17 women; on the other side 16 men and 17 women: how many women in all? How many men? How many persons?

The several New-England States, in 1860, were divided into counties, as follows: Maine had 16 counties; New Hampshire, 10 counties; Vermont, 14 counties; Massachusetts, 14 counties; Rhode Island, 5 counties; Connecticut, 8 counties. How many counties in all of the New-England States?

A farmer has 15 acres in woods, 17 in meadow, 19 in grain, and 16 in orchard: how many acres in all?

A lad is 15 years of age ; his mother is 27 years older than he, and his father 6 years older than the mother. How old are the father and the mother ?

Reproduce.

CXC VII.

Count by sevens, 1 to 64, 2 to 65, 3 to 66, 4 to 67, 5 to 68, 6 to 69, 7 to 63, and backward.

Write the following subtractions, the subtrahend underneath the minuend, and below them a straight line, with the remainder under that.

68 — 29	68 — 39	68 — 49	67 — 29	67 — 39
67 — 49	67 — 28	67 — 38	67 — 48	66 — 29
66 — 39	66 — 49	66 — 28	66 — 38	66 — 48
66 — 27	66 — 37	66 — 47	65 — 29	65 — 39
65 — 49	65 — 28	65 — 38	65 — 48	65 — 27
65 — 37	65 — 47	65 — 26	65 — 36	65 — 46
64 — 29	64 — 39	64 — 49	64 — 28	64 — 38
64 — 48	64 — 27	64 — 37	64 — 47	64 — 26
64 — 36	64 — 46	64 — 25	64 — 35	64 — 45
63 — 29	63 — 39	63 — 49	63 — 28	63 — 38
63 — 48	63 — 27	63 — 37	63 — 47	63 — 26
63 — 36	63 — 46	63 — 25	63 — 35	63 — 45
63 — 24	63 — 34	63 — 44	63 — 14	62 — 19

Drill as in Exercise XCIV.

CXC VIII.

Count by eights, 1 to 65, 2 to 66, 3 to 67, 4 to 68, 5 to 69, 6 to 62, 7 to 63, 8 to 64, and backward.

Write as in Exercise CXC VII.

62 — 29	62 — 39	62 — 49	62 — 28	62 — 38
62 — 48	62 — 27	62 — 37	62 — 47	62 — 26
62 — 36	62 — 46	62 — 25	62 — 35	62 — 45

62 — 24	62 — 34	62 — 44	62 — 23	62 — 33
62 — 43	61 — 29	61 — 39	61 — 49	61 — 28
61 — 38	61 — 48	61 — 27	61 — 37	61 — 47
61 — 26	61 — 36	61 — 46	61 — 25	61 — 35
61 — 45	61 — 24	61 — 34	61 — 44	61 — 23
61 — 33	61 — 43	61 — 22	61 — 32	61 — 42
60 — 29	60 — 39	60 — 49	60 — 28	60 — 38
60 — 48	60 — 27	60 — 37	60 — 47	60 — 26
60 — 36	60 — 46	60 — 25	60 — 35	60 — 45
60 — 24	60 — 34	60 — 44	60 — 23	60 — 33
60 — 43	60 — 22	60 — 32	60 — 42	60 — 21
60 — 31	60 — 41	60 — 11	60 — 12	60 — 13

Drill as in Exercise XCIV.

CXCIX.

Mental.

There are 64 children belonging to a school, 29 of them being boys: how many are girls?

Mr. Clinton, dealing in poultry, sells one man 15 pounds; another, 14 pounds; another, 18 pounds. His stock at the first was 63 pounds. How many pounds did he sell, and how many pounds had he left?

A school, consisting of 61 scholars, is divided into three classes. In one are 19 scholars; in another are 24 scholars. How many are there in the remaining class? When the first class stands for recitation, how many scholars are in their seats? When the second class? When the third class?

A dealer in flour bought from one person, 16 barrels; from another, 20; from another, 9; from another, 22. He sold to Mr. A., 4 barrels; to Mr. B., 7 barrels; to Mr. C., 6 barrels; to Mr. D., 5 barrels; to Mr. E., 8 barrels; to Mr. F., 7 barrels; to Mr. G., 4 barrels; to Mr. H., 7 barrels. How many barrels did he purchase in all? How many remained after each sale?

A man, undertaking a journey of 66 miles, went one day, 25 miles; the second day, 23 miles. How many miles remained after each day's travel?

A tradesman, having in his wallet 62 dollars, pays a debt of 47 dollars: how much remains?

How much more than 15 is $34 + 26$?

How much less than 34 is $62 - 36$?

Reproduce.

CC.

Count by nines, 1 to 64, 2 to 65, 3 to 66, 4 to 67, 5 to 68, 6 to 69, 7 to 61, 8 to 62, 9 to 63, and backward.

Write the following multiplications, in a neat table:

FORM: $1 \times 2 = 2$ $1 \times 3 = 3$ $1 \times 4 = 4$

2 times 5 are how many? 3 times 5? 4 times 5? 5 times 5? 6 times 5? 7 times 5? 8 times 5? 9 times 5? 10 times 5? 11 times 5? 12 times 5? (Add 12 Fives.)

2 times 6? 3 times 6? 4 times 6? 5 times 6? 6 times 6? 7 times 6? 8 times 6? 9 times 6? 10 times 6? (Add 10 Sixes.) 11 times 6? (Add 11 Sixes.)

2 times 7? 3 times 7? 4 times 7? 5 times 7? 6 times 7? 7 times 7? 8 times 7? 9 times 7? (Add 9 Sevens.)

2 times 8? 3 times 8? 4 times 8? 5 times 8? 6 times 8? 7 times 8? 8 times 8? (Add 8 Eights.)

2 times 9? 3 times 9? 4 times 9? 5 times 9? 6 times 9? 7 times 9? (Add 7 Nines.)

2 times 10? 3 times 10? 4 times 10? 5 times 10? 6 times 10? (Add 6 Tens.)

2 times 11? 3 times 11? 4 times 11? 5 times 11? 6 times 11? (Add 6 Elevens.)

2 times 12? 3 times 12? 4 times 12? 5 times 12? (Add 5 Twelves.)

Drill as in Exercise C.

CCL.

Write as in Exercise CC.

How many are 2 times 30? 2 times 31? 32? 33? 34?
 3 times 20? 3 times 21? 22? 23? 4 times 15? 16? 17?
 5 times 13? 13 times 5? 15 times 4? 16 times 4?
 17 times 4? 20 times 3? 21 times 3? 22 times 3? 23
 times 3? 30 times 2? 31 times 2? 32 times 2? 33
 times 2? 34 times 2? 2 times 15? 16? 17? 18? 19? 25?
 26? 27? 28? 29? 3 times 14? 15? 16? 17? 18? 19?
 4 times 13? 14?

Drill as in Exercise C.

CCII.

Mental.

Gram, Decigram, and Centigram are French weights: 10
 Centigrams make 1 Decigram, and 10 Decigrams make 1
 Gram. How many Decigrams in 6 Grams? In 4? In 2?
 —How many Centigrams in 5 Decigrams? In 3?

How many days are there in 9 weeks? In 8 weeks? In
 7? 6? 5? 4? 3? 2?

How many trees in an orchard, if there are 8 rows, with
 6 trees in a row? 8 trees in a row? 7? 5? 7 rows, with 9
 trees in a row? 8 trees in a row? 7? 6? 9 rows, with 7
 trees in a row? 6?

If 4 men do a piece of work in 1 day, how long will it
 take 1 man to do the same piece of work? — If it take 4
 men, 2 days to do it, how long will 1 man require? — If 4
 men, 3 days, how long 1 man?

If to build a stone wall takes 9 men, 1 day, how long
 would 1 man require? If 9 men, 7 days? If 8 days? If
 5 days? If 6 days? — If 8 men, 5 days? 8 days? 7 days?
 6 days?

What is the cost of 2 pounds of beef at 28 cents a pound?

— Of 3 pounds of lamb, at 19 cents a pound? — Of 5 pounds of sago, at 13 cents a pound? — Of 5 pounds of starch, at 12 cents a pound? — Of 4 pounds of sugar, at 16 cents a pound?

Reproduce.

CCIII.

Write the following divisions :

$$\text{FORM: } 4 \div 2 = 2$$

$$10 \div 5 = 2$$

$$16 \div 4 = 4$$

How many times is 5 contained in 60? in 55? in 50? in 45? in 40? in 35? in 30? in 25? in 20? in 15? in 10? in 5?

6, in 66? in 60? in 54? in 48? in 42? in 36? in 30? in 24? in 18? in 12? in 6?

7, in 63? in 56? in 49? in 42? in 35? in 28? in 21? in 14? in 7?

8, in 64? in 56? in 48? in 40? in 32? in 24? in 16? in 8?

9, in 63? in 54? in 45? in 36? in 27? in 18? in 9?

10, in 60? in 50? in 40? in 30? in 20? in 10?

11, in 66? in 55? in 44? in 33? in 22? in 11?

12, in 60? in 48? in 36? in 24? in 12?

Drill as in Exercise CIII.

CCIV.

Write the following divisions, the dividend above the divisor, with a line drawn between.

$$\text{FORM: } \frac{4}{2} = 2, \quad \frac{10}{5} = 2, \quad \frac{16}{4} = 4$$

Divide 66 by 6; 66 by 11; 64 by 8; 63 by 7; 63 by 9; 60 by 5; 60 by 12; 60 by 6; 60 by 10; 56 by 7; 56 by 8; 55 by 5; 55 by 11; 54 by 6; 54 by 9; 50 by 5; 50 by 10; 49 by 7; 48 by 4; 48 by 6; 48 by 8; 48 by 12; 45 by 5;

45 by 9; 44 by 4; 44 by 11; 42 by 6; 42 by 7; 40 by 4;
40 by 5; 40 by 8; 40 by 10; 36 by 3; 36 by 4; 36 by 6;
36 by 9; 36 by 12; 35 by 5; 35 by 7; 33 by 3; 33 by 11;
32 by 4; 32 by 8; 30 by 3; 30 by 5; 30 by 6; 30 by 10;
28 by 4; 28 by 7; 27 by 3; 27 by 9; 25 by 5.

Drill as in Exercise CIII.

CCV.

Write as in Exercise CCIV.

Divide 69 by 3; 68 by 2; 68 by 4; 66 by 2; 66 by 3;
65 by 5; 64 by 2; 64 by 4; 63 by 3; 62 by 2; 60 by 2;
60 by 3; 60 by 4; 60 by 15; 60 by 20; 60 by 30; 62 by
31; 63 by 21; 64 by 16; 64 by 32; 65 by 13; 66 by 22;
66 by 33; 68 by 17; 68 by 34; 69 by 21.

Drill as in Exercise CIII.

CCVI.

Mental.

A farmer wishes to plant an orchard of 64 trees in 8 rows: how many will he plant in each row? 63 trees, in 7 rows? 63 trees, in 9 rows? 56 trees, in 7 rows? 56 trees, in 8 rows? [In each case, prove by a plan upon the slate.]

A glazier has to set 6 panes of glass in each of a number of sashes. He finds that he requires for the job in all, 60 panes: how many sashes were there? [Prove it by plan.]

A certain piece of work would take 1 man, 65 days to do: how many men must be employed, that it may be done in 5 days?—How many days would it take 5 men to do it?

A butcher expended 69 dollars in buying lambs at 3 dollars each: how many lambs did he buy? 68 dollars in cattle at 34 dollars each? 60 dollars in sheep, at 6 dollars each?

How many cords of wood, at 8 dollars a cord, may be purchased for 48 dollars?

If a merchant buys a piece of silk, containing 12 yards, for 51 dollars, and desires to gain 9 dollars upon the piece, at what price must he sell it by the yard?

Is $69 - 13$, $- 17$, $+ 4$, $- 19$, $\times 2$, greater or less than $69 \div 3$, and how much?

Reproduce.

CHAPTER THE EIGHTH.

Seventy to Seventy-nine.

CCVII.

32. $69 + 1 = 60 + (9 + 1) = 60 + 10 = 6 \text{ Tens} + 1 \text{ Ten} = 7 \text{ Tens}$. For 7 Tens, we write 7 in the second place, thus: 70, which we read *Seventy*. $70 + 1$, we write 71, the 7 being *Seventy*, the 1, *One*. In letters, for 70, we add XX to the L for 50, and for following numbers to 79, add further the proper letters for the units.

Write the following table upon the blackboard :

Seventy = 7 Tens + Nothing,	LXX	70
Seventy-one = 7 Tens + One,	LXXI	71
Seventy-two = 7 Tens + Two,	LXXII	72
Seventy-three = 7 Tens + Three,	LXXIII	73
Seventy-four = 7 Tens + Four,	LXXIV	74
Seventy-five = 7 Tens + Five,	LXXV	75
Seventy-six = 7 Tens + Six,	LXXVI	76
Seventy-seven = 7 Tens + Seven,	LXXVII	77
Seventy-eight = 7 Tens + Eight,	LXXVIII	78
Seventy-nine = 7 Tens + Nine,	LXXIX	79

Drill as in Exercise XXXVI.

CCVIII.

Read the following numbers :

40; 47; 59; 70; 63; 50; 45; 71; 43; 60; 41; 73;
58; 56; 67; 72; 42; 44; 57; 74; 61; 46; 55; 75; 69;
54; 48; 76; 62; 51; 53; 77; 49; 65; 52; 78; 64; 68;
79; 66. LXX, LXIII, LXXI, LX, LXXIII, LXVII,
LXXII, LXXIV, LXI, LXXV, LXIX, LXII, LXXVI,
LXXVII, LXV, LXIV, LXXVIII, LXVIII, LXXIX,
LXVI.

Drill as in Exercise XXXVII. What does 7 stand for in the 2d place?
In the first? 6? 5? 4? 3? 2? 1?

CCIX.

Write the following numbers, in letters and figures :

Sixty	Seventy	Sixty-one	Seventy-one
Sixty-two	Seventy-two	Sixty-three	Seventy-three
Sixty-four	Seventy-four	Sixty-five	Seventy-five
Sixty-six	Seventy-six	Sixty-seven	Seventy-seven
Sixty-eight	Seventy-eight	Sixty-nine	Seventy-nine

Vary and continue the exercise, until each pupil writes neatly and promptly every number up to 79. Analyze and read.

CCX.

Count 1 to 79 and backward.

Write the following additions :

FORM: $11 + 3 = 14$
 $17 + 2 = 19$
 $14 + 4 = 18$

Add 69 and 1; 70 and 1; 71 and 1; 72 and 1; 73 and 1;
74 and 1; 75 and 1; 76 and 1; 77 and 1; 78 and 1; 68
and 2; 70 and 2; 72 and 2; 74 and 2; 76 and 2; 69 and
2; 71 and 2; 73 and 2; 75 and 2; 77 and 2; 67 and 3; 70

and 3; 73 and 3; 76 and 3; 68 and 3; 71 and 3; 74 and 3; 69 and 3; 72 and 3; 75 and 3; 66 and 4; 70 and 4; 74 and 4; 67 and 4; 71 and 4; 75 and 4; 68 and 4; 72 and 4; 69 and 4; 73 and 4; 65 and 5; 70 and 5; 66 and 5; 71 and 5; 67 and 5; 72 and 5; 68 and 5; 73 and 5; 69 and 5; 74 and 5.

Drill as in Exercise CX.

CCXI.

Count by twos, 1 to 79, 2 to 78, and backward.

Write as in Exercise CCX.

Add 64 and 6; 70 and 6; 65 and 6; 71 and 6; 66 and 6; 72 and 6; 67 and 6; 73 and 6; 68 and 6; 69 and 6; 63 and 7; 70 and 7; 64 and 7; 71 and 7; 65 and 7; 72 and 7; 66 and 7; 67 and 7; 68 and 7; 69 and 7; 62 and 8; 70 and 8; 63 and 8; 71 and 8; 64 and 8; 65 and 8; 66 and 8; 67 and 8; 68 and 8; 69 and 8; 61 and 9; 70 and 9; 62 and 9; 63 and 9; 64 and 9; 65 and 9; 66 and 9; 67 and 9; 68 and 9; 69 and 9.

Drill as in Exercise CX.

CCXII.

Count by threes, 1 to 79, 2 to 77, 3 to 78, and backward.

Write as in Exercise CCX.

60 + 1	70 + 1	61 + 1	71 + 1
62 + 1	72 + 1	63 + 1	73 + 1
64 + 1	74 + 1	65 + 1	75 + 1
66 + 1	76 + 1	67 + 1	77 + 1
68 + 1	78 + 1	69 + 1	60 + 2
70 + 2	61 + 2	71 + 2	62 + 2
72 + 2	63 + 2	73 + 2	64 + 2
74 + 2	65 + 2	75 + 2	66 + 2
76 + 2	67 + 2	77 + 2	68 + 2
69 + 2	60 + 3	70 + 3	61 + 3

71 + 3	62 + 3	72 + 3	63 + 3
73 + 3	64 + 3	74 + 3	65 + 3
75 + 3	66 + 3	76 + 3	67 + 3
68 + 3	69 + 3	60 + 4	70 + 4
61 + 4	71 + 4	62 + 4	72 + 4
63 + 4	73 + 4	64 + 4	74 + 4
65 + 4	75 + 4	66 + 4	67 + 4
68 + 4	69 + 4	59 + 5	58 + 5

Drill as in Exercise CX.

CCXIII.

Write as in Exercise CCX.

60 + 5	70 + 5	61 + 5	71 + 5
62 + 5	72 + 5	63 + 5	73 + 5
64 + 5	74 + 5	65 + 5	66 + 5
67 + 5	68 + 5	69 + 5	60 + 6
70 + 6	61 + 6	71 + 6	62 + 6
72 + 6	63 + 6	73 + 6	64 + 6
65 + 6	66 + 6	67 + 6	68 + 6
69 + 6	60 + 7	70 + 7	61 + 7
71 + 7	62 + 7	72 + 7	63 + 7
64 + 7	65 + 7	66 + 7	67 + 7
68 + 7	69 + 7	60 + 8	70 + 8
61 + 8	71 + 8	62 + 8	63 + 8
64 + 8	65 + 8	66 + 8	67 + 8
68 + 8	69 + 8	60 + 9	70 + 9
61 + 9	62 + 9	63 + 9	64 + 9
65 + 9	66 + 9	67 + 9	68 + 9
69 + 9	59 + 9	58 + 9	57 + 9
56 + 9	55 + 9	54 + 9	53 + 9
59 + 8	58 + 8	57 + 8	56 + 8

Drill as in Exercise CX.

CCXIV.

Count by fours, 1 to 77, 2 to 78, 3 to 79, 4 to 76, and backward.

Write the following groups of numbers, in columns, the amount below, separated by a line.

13	+	24	+	5	+	16	+	7	+	8
24	+	15	+	6	+	7	+	8	+	19
15	+	6	+	17	+	8	+	9	+	19
16	+	17	+	8	+	9	+	19	+	9
18	+	19	+	9	+	9	+	9	+	9
19	+	9	+	9	+	19	+	9	+	9
18	+	18	+	8	+	8	+	18	+	8
17	+	27	+	7	+	7	+	7	+	7
13	+	16	+	18	+	4	+	15	+	9
13	+	17	+	9	+	13	+	7	+	14
23	+	18	+	19	+	4	+	7	+	5
13	+	19	+	15	+	7	+	14	+	8
14	+	5	+	18	+	14	+	13	+	9
14	+	16	+	8	+	17	+	7	+	15
14	+	17	+	7	+	18	+	8	+	9
14	+	8	+	16	+	17	+	14	+	6
14	+	19	+	8	+	15	+	3	+	14
15	+	15	+	6	+	16	+	17	+	7
15	+	16	+	15	+	6	+	5	+	16
15	+	17	+	6	+	6	+	8	+	18
15	+	18	+	7	+	5	+	6	+	19
15	+	9	+	16	+	8	+	7	+	17
16	+	18	+	7	+	19	+	5	+	7
16	+	9	+	8	+	16	+	14	+	8
17	+	26	+	4	+	7	+	8	+	17
17	+	9	+	15	+	8	+	7	+	19

Drill as in Exercise CXVI.

CCXV.

Count by fives, 1 to 76, 2 to 77, 3 to 78, 4 to 79, 5 to 75, and backward.

Write as in Exercise CCXIV.

$$22 + 23 + 14 + 18$$

$$15 + 26 + 25 + 13$$

$$10 + 27 + 22 + 20$$

$$23 + 17 + 16 + 23$$

$$17 + 27 + 13 + 18$$

$$15 + 14 + 27 + 21$$

$$14 + 17 + 28 + 18$$

$$10 + 27 + 22 + 17$$

$$16 + 12 + 29 + 19$$

$$14 + 15 + 28 + 15$$

$$17 + 11 + 20 + 27$$

$$18 + 18 + 18 + 18$$

$$15 + 25 + 15 + 15$$

$$17 + 27 + 17 + 17$$

$$16 + 6 + 16 + 32$$

$$13 + 24 + 15 + 23$$

$$15 + 16 + 17 + 30$$

$$16 + 9 + 29 + 17$$

$$17 + 22 + 18 + 21$$

$$21 + 19 + 19 + 18$$

$$12 + 24 + 28 + 14$$

$$24 + 15 + 18 + 22$$

$$16 + 26 + 23 + 12$$

$$15 + 25 + 27 + 10$$

$$23 + 13 + 27 + 15$$

$$21 + 16 + 12 + 26$$

$$17 + 24 + 25 + 13$$

$$16 + 16 + 25 + 14$$

$$13 + 17 + 24 + 24$$

$$19 + 19 + 19 + 19$$

$$16 + 16 + 26 + 16$$

$$14 + 24 + 20 + 15$$

$$12 + 22 + 29 + 12$$

$$14 + 15 + 26 + 15$$

$$12 + 24 + 15 + 27$$

$$11 + 12 + 39 + 17$$

Drill as in Exercise CXVI.

CCXVI.

Mental.

A poultryman one morning had for sale 22 chickens, 19 turkeys, 15 geese, and 17 ducks: how many fowls were there in all?

Mr. Stoddard is 37 years old, and his father is older by 38 years: how old is the father?

Mrs. Edmonds rides 25 miles on Monday; 14 miles on Tuesday; 12 miles on Wednesday; 17 miles on Thursday;

and 9 miles on Friday: how many miles does she travel in all?

A lady went shopping, and expended at Powell & Co.'s store 13 dollars; at Reading's, 14 dollars; at Fisk & Co.'s, 9 dollars; at Cunningham's, 25 dollars; at Marsh & Co.'s, 15 dollars: how many dollars did she expend in all?

Mr. Blake gathers from his trees a number of peaches, and when he reaches home finds in one basket 21 peaches; in another, 17; in another, 19; in another, 22: how many are there in all?

In one pasture graze 9 head of cattle; in another, 19; in another, 12; in another, 15; in another, 18; in another, 5: how many head are there in all?

In a patch of woods are 13 fir-trees, 18 oak-trees, 27 ash-trees, and 16 walnut-trees: how many in all?

Reproduce.

CCXVII.

Count by sixes, 1 to 79, 2 to 74, 3 to 75, 4 to 76, 5 to 77, 6 to 78, and backward.

Write the following subtractions, the subtrahend underneath the minuend, and below them a straight line, with the remainder under that.

78—39	77—28	76—19	75—38
74—27	73—19	72—26	71—39
70—27	77—39	76—48	75—19
74—39	73—28	72—49	71—28
70—19	76—17	75—47	74—18
73—27	72—38	71—17	70—38
75—56	74—36	73—26	72—17
71—36	70—46	74—15	73—35
72—25	71—15	70—45	73—54

72—14	71—24	70—34	72—53
71—43	70—33	71—32	70—42
70—11	68—19	67—19	66—19

Drill as in Exercise XCIV.

CCXVIII.

Mental.

A lady went shopping with 79 dollars in her purse. She bought at one store what cost 17 dollars; at another, what cost 13 dollars; at another, what cost 22 dollars; at another, what cost 9 dollars: how many dollars remained after each purchase?

A generous gentleman, gathering 78 fine apples from his orchard, gave 8 friends 8 apples each: how many had he remaining for himself?

A farmer, having 77 sheep, divided them between his two fields, which were separated by the road. On one side of the road he put 29 sheep: how many did he put in the field on the other side?

A tower, 75 feet high, needs repair at the top. If scaffolding is built 48 feet high, how far is it still to the top?

A man, owning 76 acres of land, gave to his son 47 acres, and the remainder to his daughter: how many did the latter receive?

The Queen of England is (in 1870) 51 years of age. She became Queen 33 years ago (in 1837): how old was she at that time?

Clifford had 70 cents, of which he gave 35 cents to his sister: how many cents had he remaining?

At the time of his death (in 1834) General Lafayette was 77 years of age. Forty-five years before (in 1789) he was made commander-in-chief of the National Guard of France. How old was he then?

Reproduce.

CCXIX.

Count by sevens, 1 to 78, 2 to 79, 3 to 73, 4 to 74, 5 to 75, 6 to 76, 7 to 77, and backward.

Write the following multiplications, in a neat table :

$$\begin{array}{l} \text{FORM:} \quad 1 \times 2 = 2 \\ \quad \quad 1 \times 4 = 4 \end{array}$$

2 times 6 are how many? 3 times 6? 4 times 6? 5 times 6? 6 times 6? 7 times 6? 8 times 6? 9 times 6? 10 times 6? 11 times 6? 12 times 6? (Add 12 Sixes.)

2 times 7? 3 times 7? 4 times 7? 5 times 7? 6 times 7? 7 times 7? 8 times 7? 9 times 7? 10 times 7? (Add 10 Sevens.) 11 times 7? (Add 11 Sevens.)

2 times 8? 3 times 8? 4 times 8? 5 times 8? 6 times 8? 7 times 8? 8 times 8? 9 times 8? (Add 9 Eights.)

2 times 9? 3 times 9? 4 times 9? 5 times 9? 6 times 9? 7 times 9? 8 times 9? (Add 8 Nines.)

2 times 10? 3 times 10? 4 times 10? 5 times 10? 6 times 10? 7 times 10? (Add 7 Tens.)

2 times 11? 3 times 11? 4 times 11? 5 times 11? 6 times 11? 7 times 11? (Add 7 Elevens.)

2 times 12? 3 times 12? 4 times 12? 5 times 12? 6 times 12? (Add 6 Twelves.)

Drill as in Exercise C.

CCXX.

Write as in Exercise CCXIX.

How many are 2 times 35? 2 times 36? 37? 38? 39? 3 times 24? 25? 26? 4 times 18? 19? 5 times 14? 15? 6 times 13? 13 times 6? 14 times 5? 15 times 5? 18 times 4? 19 times 4? 24 times 3? 25 times 3? 26 times 3? 35 times 2? 36 times 2? 37 times 2? 38 times 2? 39 times 2?

Drill as in Exercise C.

CCXXI.

Mental.

A pair is how many single things? How many chickens in 5 pairs? In 15 pairs? In 35 pairs? In 39 pairs?

A yoke of oxen is how many oxen? How many oxen in 8 yoke? In 18 yoke? In 38 yoke?

A whole apple is how many half-apples? How many half-apples in 4 whole apples? In 6 whole apples? In 16? In 26? In 36?

If each tree in an orchard produces 12 bushels of fruit, how many bushels may be gathered from 6 trees? From 5 trees? From 4 trees? From 3 trees? From 2 trees?

'Harry James has a book-case with 4 shelves. On each shelf are 18 books: how many on 2 shelves? On 3 shelves? Altogether?

If a man earns 4 dollars a day, how many dollars will he earn in 6 days? In 12 days? In 16 days? In 18 days? In 19 days?

What are a man's expenses in a month, if he pay 16 dollars for house-rent, 34 dollars for food, 9 dollars for fuel, 12 dollars for articles of clothing, and 5 dollars for other matters?

In ascertaining the depth of the sea, a measure called a fathom is used. 6 feet make a fathom. How many feet in 4 fathoms? In 7 fathoms? In 12 fathoms? In 13 fathoms?

If 4 men do a piece of work in 4 days, how long will it take 1 man to do it? How long would it take him to do 4 times as much work?

Bought 7 barrels of flour at 9 dollars a barrel, and sold it at 10 dollars a barrel: what did the whole cost? For what was the whole sold? What was the gain?

Reproduce.

CCXXII.

Count by eights, 1 to 73, 2 to 74, 3 to 75 4 to 76, 5 to 77, 6 to 78, 7 to 79, 8 to 72, and backward.

33. The number given to be multiplied is called the *multiplcand*.

34. The number by which we multiply is called the *multiplier*.

35. The number produced by the multiplication of two numbers is called the *product*.

In the group, $8 \times 6 = 48$, which is the product? which the multiplicand? which the multiplier? In the group, $12 \times 3 = 36$, which — which — which? In the group, $11 \times 5 = 55$, which — which — which?

36. In all additions, subtractions, and multiplications, where one term is written below the other, write the several figures in their appropriate places: units under units, &c., &c.

37. In the multiplication of numbers of two or more places, first multiply the right-hand figure of the multiplicand, then the second figure, then the figures farther to the left, if any. If the product of one of these single multiplications exceeds 9, write as in addition, when the sum of a column exceeds that number.

Write the following multiplications, the multiplier below the multiplicand, a line below that, and underneath the product.

13×2	13×3	13×4	13×5
13×6	14×2	14×3	14×4
14×5	15×2	15×3	15×4
15×5	16×2	16×3	16×4
17×2	17×3	17×4	18×2
18×3	18×4	19×2	19×3
19×4	20×2	20×3	21×2
21×3	22×2	22×3	23×2

23×3	24×2	24×3	25×2
25×3	26×2	26×3	27×2
28×2	29×2	30×2	31×2
32×2	33×2	34×2	35×2
36×2	37×2	38×2	39×2

DRILL: 13×2 : 2 times 3 ones = 6 ones; 6 to be written in the units place of the product. 2 times 1 ten = 2 tens; 2 to be written in the tens place of the product. Read the multiplicand; the multiplier; the product. Analyze each. Read each figure of each: remembering to read the tens independently: 1 in the tens place represents what number? 2? 3? 4? 5? 6? 7? Then, products being erased, let them be stated at sight. Then the reproduction.

CCXXIII.

Count by nines, 1 to 73, 2 to 74, 3 to 75, 4 to 76, 5 to 77, 6 to 78, 7 to 79, 8 to 71, 9 to 72, and backward.

Write the following divisions:

FORM: $4 \div 2 = 2$, $10 \div 5 = 2$, $16 \div 4 = 4$.

How many times is 4 contained in 48? in 44? in 40? in 36? in 32? in 28? in 24? in 20? in 16?

5, in 60? in 55? in 50? in 45? in 40? in 35? in 30? in 25? in 20? in 15?

How many times is 6 contained in 72? in 66? in 60? in 54? in 48? in 42? in 36? in 30? in 24? in 18? in 12? in 6?

7, in 77? in 70? in 63? in 56? in 49? in 42? in 35? in 28? in 21? in 14? in 7?

8, in 72? in 64? in 56? in 48? in 40? in 32? in 24? in 16? in 8?

9, in 72? in 63? in 54? in 45? in 36? in 27? in 18? in 9?

10, in 70? in 60? in 50? in 40? in 30? in 20? in 10?

11, in 77? in 66? in 55? in 44? in 33? in 22? in 11?

12, in 72? in 60? in 48? in 36? in 24? in 12?

Drill as in Exercise CIII.

CCXXIV.

Count by tens, 1 to 71, 2 to 72, 3 to 73, 4 to 74, 5 to 75, 6 to 76, 7 to 77, 8 to 78, 9 to 79, 10 to 70, and backward.

Write the following divisions, the dividend above the divisor, with a line drawn between:

FORM: $\frac{1}{2} = 2$ $\frac{1}{8} = 2$ $\frac{1}{4} = 4$

Divide 77 by 7; 77 by 11; 72 by 6; 72 by 8; 72 by 9; 72 by 12; 70 by 10; 70 by 7; 66 by 6; 66 by 11; 64 by 8; 63 by 7; 63 by 9; 60 by 5; 60 by 6; 60 by 10; 60 by 12; 56 by 7; 56 by 8; 55 by 5; 55 by 11; 54 by 6; 54 by 9; 50 by 5; 50 by 10; 49 by 7; 48 by 4; 48 by 6; 48 by 8; 48 by 12; 45 by 5; 45 by 9; 44 by 4; 44 by 11; 42 by 6; 42 by 7; 40 by 4; 40 by 5; 40 by 8; 40 by 10; 36 by 3; 36 by 4; 36 by 6; 36 by 9; 36 by 12; 35 by 5; 35 by 7; 33 by 3; 33 by 11; 32 by 4; 32 by 8.

Drill as in Exercise CIII.

CCXXV.

Write as in Exercise CCXXIV.

Divide 78 by 2; 78 by 3; 78 by 6; 78 by 13; 78 by 26; 78 by 39; 76 by 2; 76 by 4; 76 by 19; 76 by 38; 75 by 3; 75 by 5; 75 by 15; 75 by 25; 74 by 2; 74 by 37; 72 by 2; 72 by 3; 72 by 4; 72 by 18; 72 by 24; 72 by 36; 70 by 2; 70 by 5; 70 by 14; 70 by 35.

Drill as in Exercise CIII.

CCXXVI.

Mental.

One man can do a certain piece of work in 72 days. But he wants it done in 18 days: how many men will be required? How many would be required to have it done in

12 days? In 9 days? In 8 days? In 6 days? In 4 days?
In 2 days? In 1 day?

To build a stone fence, a farmer finds, would take 1 man. 78 days. But he sets 6 men to work at it: when will the work be done? If he sets 13 men at it, when would it be done?

If a man walks 5 miles an hour, how long would it take him to walk 70 miles? 75 miles?

If he walk 76 miles in 19 hours, how many miles does he travel in an hour?

74 oxen will make how many yoke? 70 oxen? 64 oxen?

Mr. Howard purchased 77 pounds of flour, and distributed it equally among 11 poor families: how many pounds did each family receive?

If 9 dollars will buy a barrel of flour, how many barrels may be bought for 72 dollars? For 54 dollars? For 36 dollars? For 63 dollars? For 45 dollars?

3 feet make a yard: how many yards are there in 9 feet? In 27 feet? In 33 feet? In 45 feet? In 57 feet? In 63 feet? In 78 feet?

There are 4 quarts in a gallon: what is the price of a quart of vinegar, if a gallon costs 76 cents? If it costs 68 cents? If 60 cents? If 52 cents?

Reproduce.

CHAPTER THE NINTH.

Eighty to Eighty-nine.

CCXXVII.

38. $79 + 1 = 70 + (9 + 1) = 70 + 10 = 7 \text{ tens} + 1 \text{ ten} = 8 \text{ tens}$. For 8 tens, we write 8 in the second place, thus: 80, which we read Eighty. $80 + 1$, we write 81, the

8 being *Eighty*, the 1, *One*. In letters, for 80, we add **XXX**, 30, to L, 50; and for the numbers following to 89, add the numbers appropriate to the units.

Write the following table upon the blackboard :

Eighty = 8 Tens + Nothing,	LXXX	80
Eighty-one = 8 Tens + One,	LXXXI	81
Eighty-two = 8 Tens + Two,	LXXXII	82
Eighty-three = 8 Tens + Three,	LXXXIII	83
Eighty-four = 8 Tens + Four,	LXXXIV	84
Eighty-five = 8 Tens + Five,	LXXXV	85
Eighty-six = 8 Tens + Six,	LXXXVI	86
Eighty-seven = 8 Tens + Seven,	LXXXVII	87
Eighty-eight = 8 Tens + Eight,	LXXXVIII	88
Eighty-nine = 8 Tens + Nine,	LXXXIX	89

Drill as in Exercise XXXVI.

CCXXVIII.

Read the following numbers :

50; 57; 69; 80; 73; 60; 55; 81; 53; 70; 51; 83;
 68; 66; 77; 82; 52; 54; 67; 84; 71; 56; 65; 85; 79;
 64; 58; 86; 72; 61; 63; 87; 59; 75; 62; 88; 74; 78;
 89; 76. **LXXX**, **LXXIII**, **LXXXI**, **LXX**, **LXXXIII**,
LXXVII, **LXXXII**, **LXXXIV**, **LXXI**, **LXXXV**, **LXXIX**,
LXXXVI, **LXXII**, **LXXXVII**, **LXXV**, **LXXXVIII**,
LXXIV, **LXXVIII**, **LXXXIX**, **LXXVI**.

Drill as in Exercise XXXVII. What does 8 in the 2d place stand for?
 In the 1st place? 7? 6? 5? 4? 3? 2? 1?

CCXXIX.

Write the following numbers in letters and figures :

Seventy	Eighty	Seventy-one	Eighty-one
Seventy-two	Eighty-two	Seventy-three	Eighty-three
Seventy-four	Eighty-four	Seventy-five	Eighty-five

Seventy-six Eighty-six Seventy-seven Eighty-seven
 Seventy-eight Eighty-eight Seventy-nine Eighty-nine

Vary and continue the exercise, until each pupil writes neatly and promptly, every number up to 89. Analyze and read.

CCXXX.

Count from 1 to 89, and by twos from 1 to 89, 2 to 88, and backward.

Write the following additions :

$$\begin{array}{rcl} \text{Form:} & 11 + 3 & = 14 \\ & 17 + 2 & = 19 \\ & 14 + 4 & = 18 \end{array}$$

Add 79 and 1; 80 and 1; 81 and 1; 82 and 1; 83 and 1; 84 and 1; 85 and 1; 86 and 1; 87 and 1; 88 and 1; 78 and 2; 80 and 2; 82 and 2; 84 and 2; 86 and 2; 79 and 2; 81 and 2; 83 and 2; 85 and 2; 87 and 2; 77 and 3; 80 and 3; 83 and 3; 86 and 3; 78 and 3; 81 and 3; 84 and 3; 79 and 3; 82 and 3; 85 and 3; 76 and 4; 80 and 4; 84 and 4; 77 and 4; 81 and 4; 85 and 4; 78 and 4; 82 and 4; 79 and 4; 83 and 4; 75 and 5; 80 and 5; 76 and 5; 81 and 5; 77 and 5; 82 and 5; 78 and 5; 83 and 5; 79 and 5; 84 and 5.

Drill as in Exercise CX.

CCXXXI.

Count by threes from 1 to 88, 2 to 89, 3 to 87, and backward.

Write as in Exercise CCXXX.

Add 74 and 6; 80 and 6; 75 and 6; 81 and 6; 76 and 6; 82 and 6; 77 and 6; 83 and 6; 78 and 6; 79 and 6; 73 and 7; 80 and 7; 74 and 7; 81 and 7; 75 and 7; 82 and 7; 76 and 7; 77 and 7; 78 and 7; 79 and 7; 72 and 8; 80 and

8; 73 and 8; 81 and 8; 74 and 8; 75 and 8; 76 and 8; 77 and 8; 78 and 8; 79 and 8; 71 and 9; 80 and 9; 72 and 9; 73 and 9; 74 and 9; 75 and 9; 76 and 9; 77 and 9; 78 and 9; 79 and 9.

Drill as in Exercise CX.

CCXXXII.

Count by fours, 1 to 89, 2 to 86, 3 to 87, 4 to 88, and backward.

Write as in Exercise CCXXX.

70 + 1	80 + 1	71 + 1	81 + 1
72 + 1	82 + 1	73 + 1	83 + 1
74 + 1	84 + 1	75 + 1	85 + 1
76 + 1	86 + 1	77 + 1	87 + 1
78 + 1	88 + 1	79 + 1	70 + 2
80 + 2	71 + 2	81 + 2	72 + 2
82 + 2	73 + 2	83 + 2	74 + 2
84 + 2	75 + 2	85 + 2	76 + 2
86 + 2	77 + 2	87 + 2	78 + 2
79 + 2	70 + 3	80 + 3	71 + 3
81 + 3	72 + 3	82 + 3	73 + 3
83 + 3	74 + 3	84 + 3	75 + 3
85 + 3	76 + 3	86 + 3	77 + 3
78 + 3	79 + 3	70 + 4	80 + 4
71 + 4	81 + 4	72 + 4	82 + 4
73 + 4	83 + 4	74 + 4	84 + 4
75 + 4	85 + 4	76 + 4	77 + 4
78 + 4	79 + 4	69 + 2	68 + 3
67 + 4	66 + 5	69 + 3	68 + 4
67 + 5	66 + 6	69 + 4	68 + 5
67 + 6	66 + 7	69 + 5	68 + 6
67 + 7	66 + 8	65 + 9	64 + 7

Drill as in Exercise CX.

CCXXXIII.

Count by fives, 1 to 86, 2 to 87, 3 to 88, 4 to 89, 5 to 85, and backward.

Write as in Exercise CCXXX.

70 + 5	80 + 5	71 + 5	81 + 5
72 + 5	82 + 5	73 + 5	83 + 5
74 + 5	84 + 5	75 + 5	76 + 5
77 + 5	78 + 5	79 + 5	70 + 6
80 + 6	71 + 6	81 + 6	72 + 6
82 + 6	73 + 6	83 + 6	74 + 6
75 + 6	76 + 6	77 + 6	78 + 6
79 + 6	70 + 7	80 + 7	71 + 7
81 + 7	72 + 7	82 + 7	73 + 7
74 + 7	75 + 7	76 + 7	77 + 7
78 + 7	79 + 7	70 + 8	80 + 8
71 + 8	81 + 8	72 + 8	73 + 8
74 + 8	75 + 8	76 + 8	77 + 8
78 + 8	79 + 8	70 + 9	80 + 9
71 + 9	72 + 9	73 + 9	74 + 9
75 + 9	76 + 9	77 + 9	78 + 9
79 + 9	69 + 9	69 + 8	69 + 7

Drill as in Exercise CX.

CCXXXIV.

Count by sixes, 1 to 85, 2 to 86, 3 to 87, 4 to 88, 5 to 89, 6 to 84, and backward.

Write the following groups of numbers, in columns, the amount below, separated by a line.

13 + 24 +	5 + 16 + 17 +	8
24 + 15 + 16 +	7 + 8 + 19	
15 + 6 + 17 +	8 + 19 + 19	
16 + 17 + 18 +	9 + 19 + 9	

18 + 19 + 9 + 19 + 9 + 9
 19 + 9 + 9 + 19 + 9 + 19
 18 + 18 + 8 + 8 + 18 + 18
 17 + 27 + 7 + 17 + 7 + 7
 13 + 16 + 18 + 14 + 15 + 9
 13 + 17 + 19 + 13 + 7 + 14
 23 + 18 + 19 + 4 + 7 + 15
 13 + 19 + 15 + 7 + 14 + 18
 14 + 5 + 18 + 14 + 13 + 19
 14 + 16 + 8 + 17 + 17 + 15
 14 + 17 + 7 + 18 + 8 + 19
 14 + 8 + 16 + 17 + 14 + 16
 14 + 19 + 8 + 15 + 13 + 14
 15 + 15 + 16 + 16 + 17 + 7
 15 + 16 + 15 + 16 + 5 + 16
 15 + 17 + 16 + 6 + 8 + 18
 15 + 18 + 7 + 15 + 6 + 19
 15 + 9 + 16 + 18 + 7 + 17
 16 + 18 + 7 + 19 + 15 + 7
 16 + 9 + 8 + 16 + 14 + 18
 17 + 26 + 14 + 7 + 8 + 17
 17 + 9 + 15 + 18 + 7 + 19

Drill as in Exercise CXVI.

CCXXXV.

Count by sevens, 1 to 85, 2 to 86, 3 to 87, 4 to 88, 5 to 89, 6 to 83, 7 to 84, and backward.

Write as in Exercise CCXXXIV.

22 + 23 + 24 + 18	17 + 32 + 18 + 21
15 + 26 + 35 + 13	21 + 19 + 29 + 18
10 + 37 + 22 + 20	12 + 24 + 38 + 14
23 + 17 + 16 + 33	24 + 15 + 28 + 22
17 + 27 + 18 + 28	16 + 36 + 23 + 12

15 + 14 + 27 + 31	15 + 25 + 37 + 10
14 + 27 + 28 + 18	23 + 13 + 37 + 15
10 + 27 + 22 + 27	21 + 16 + 12 + 36
16 + 12 + 29 + 29	17 + 34 + 25 + 13
14 + 15 + 28 + 25	16 + 26 + 25 + 14
17 + 11 + 30 + 27	13 + 27 + 24 + 24
18 + 18 + 28 + 18	19 + 19 + 29 + 19
15 + 35 + 15 + 15	16 + 26 + 26 + 16
17 + 27 + 17 + 27	24 + 24 + 20 + 15
16 + 16 + 16 + 32	12 + 22 + 39 + 12
13 + 24 + 25 + 23	14 + 15 + 26 + 25
15 + 16 + 17 + 40	12 + 24 + 25 + 27
16 + 19 + 29 + 17	18 + 23 + 18 + 28

Drill as in Exercise CXVI.

CCXXXVI.

Mental.

A fishmonger, reckoning up his stock of fish, found that he had 14 cod, 27 haddock, 16 mackerel, 25 perch, and 7 pick-erel: how many had he in all?

In the State of California, there are 46 counties; in Oregon, there are 19 counties; in the territory of Washington, there are 19 counties: how many counties in the three?

There are elected in the following States the number of members of Congress set down: Maine elects 5; New Hampshire, 3; Vermont, 3; Massachusetts, 10; Rhode Island, 2; Connecticut, 4. How many do these States choose all together?

New York chooses 31 members; New Jersey, 5; Pennsylvania, 24; Delaware, 1; Maryland, 5: how many do these choose?

West Virginia chooses 3 members; Virginia, 8; North Carolina, 7; South Carolina, 4; Georgia, 7; Florida, 1;

Alabama, 6 ; Mississippi, 5 ; Louisiana, 5 ; Texas, 4 : how many do these choose ?

Ohio chooses 19 members ; Michigan, 6 ; Wisconsin, 6 ; Illinois, 14 ; Indiana, 11 ; Kentucky, 9 ; Tennessee, 8 : how many do these choose ?

Minnesota chooses 2 members ; Iowa, 6 ; Missouri, 9 ; Arkansas, 3 ; Kansas, 1 ; Nebraska, 1 ; Nevada, 1 ; Oregon, 1 ; California, 3 : how many do these choose ?

Reproduce.

CCXXXVII.

Count by eights, 1 to 89, 2 to 82, 3 to 83, 4 to 84, 5 to 85, 6 to 86, 7 to 87, 8 to 88, and backward.

Write the following subtractions, the subtrahend underneath the minuend, and below them a straight line, with the remainder under that.

88 — 49	87 — 38	87 — 29	86 — 48
86 — 39	86 — 27	85 — 59	85 — 36
85 — 27	85 — 18	84 — 29	84 — 17
84 — 36	84 — 45	84 — 58	83 — 54
83 — 49	83 — 35	83 — 28	83 — 16
83 — 67	82 — 63	82 — 59	82 — 44
82 — 38	82 — 25	82 — 17	82 — 6
81 — 69	81 — 52	81 — 48	81 — 33
81 — 27	81 — 14	81 — 26	81 — 35
80 — 59	80 — 41	80 — 38	80 — 22
80 — 17	80 — 63	80 — 56	80 — 44
80 — 35	78 — 39	77 — 48	77 — 29
76 — 18	76 — 29	76 — 37	75 — 49
75 — 36	75 — 27	75 — 18	74 — 9
74 — 18	74 — 27	74 — 16	74 — 5
73 — 59	73 — 48	73 — 37	73 — 26

Drill as in Exercise XCIV.

CCXXXVIII.

Mental.

A fruit-woman, having in the morning 89 oranges, sold one person 7 of them; another, 9; another, 12; another, 8; another, 4; another, 6; another, 10; another, 5; another, 13; another, 11: how many had she left after each sale?

Eugene is 8 years old; his father is 32 years old; his grandfather is 58 years old; his great-grandfather is 83 years old: how much younger is Eugene than each of these relatives?

A full cistern, holding 85 gallons of water, sprang a-leak, and 29 gallons ran out: how many gallons remained? If 47 gallons had remained, how many would have run out? If 38? If 16?

On the side of a school-house were windows containing 84 panes of glass. After a tempest of hail it was found that only 45 panes were whole: how many panes had been broken?

George Washington was 67 years of age when he died. He was 43 years old when he became the commander of the American armies: how long was that before his death?

A merchant has of a certain quality of cloth 87 yards: when he has sold 35 yards, how many yards remain?

Reproduce.

CCXXXIX.

Count by nines, from 1 to 82, 2 to 83, 3 to 84, 4 to 85, 5 to 86, 6 to 87, 7 to 88, 8 to 89, 9 to 81, and backward.

Write the following multiplications, in a neat table:

FORM:	$1 \times 2 = 2$
	$1 \times 3 = 3$
	$1 \times 4 = 4$

6 times 6 are how many? 7 times 6? 8 times 6? 9 times 6? 10 times 6? 11 times 6? 12 times 6?

2 times 7 are how many? 3 times 7? 4 times 7? 5 times 7? 6 times 7? 7 times 7? 8 times 7? 9 times 7? 10 times 7? 11 times 7? 12 times 7? (Add 12 Sevens.)

2 times 8? 3 times 8? 4 times 8? 5 times 8? 6 times 8? 7 times 8? 8 times 8? 9 times 8? 10 times 8? (Add 10 Eights.) 11 times 8? (Add 11 Eights.)

2 times 9? 3 times 9? 4 times 9? 5 times 9? 6 times 9? 7 times 9? 8 times 9? 9 times 9? (Add 9 Nines.)

2 times 10? 3 times 10? 4 times 10? 5 times 10? 6 times 10? 7 times 10? 8 times 10? (Add 8 Tens.)

2 times 11? 3 times 11? 4 times 11? 5 times 11? 6 times 11? 7 times 11? 8 times 11? (Add 8 Elevens.)

2 times 12? 3 times 12? 4 times 12? 5 times 12? 6 times 12? 7 times 12? (Add 7 Twelves.)

Drill as in Exercise C.

CCXL.

Write as in Exercise CCXXXIX.

How many are 2 times 40? 2 times 41? 42? 43? 44? 3 times 27? 28? 29? 4 times 20? 21? 22? 5 times 16? 17? 6 times 14? 14 times 6? 16 times 5? 17 times 5? 20 times 4? 21 times 4? 22 times 4? 27 times 3? 28 times 3? 29 times 3? 40 times 2? 41 times 2? 42 times 2? 43 times 2? 44 times 2?

Drill as in Exercise C.

CCXLI.

Count by tens, 1 to 81, 2 to 82, 3 to 83, 4 to 84, 5 to 85, 6 to 86, 7 to 87, 8 to 88, 9 to 89, 10 to 80, and backward.

Write the following multiplications, the multiplier under the multiplicand, the product underneath, separated by a line: units under units, &c.

13 × 6	14 × 6	13 × 5	14 × 5	15 × 5
16 × 5	17 × 5	13 × 4	14 × 4	15 × 4
16 × 4	17 × 4	18 × 4	19 × 4	20 × 4
21 × 4	22 × 4	13 × 3	14 × 3	15 × 3
16 × 3	17 × 3	18 × 3	19 × 3	20 × 3
21 × 3	22 × 3	23 × 3	24 × 3	25 × 3
26 × 3	27 × 3	28 × 3	29 × 3	26 × 2
27 × 2	28 × 2	29 × 2	30 × 2	31 × 2
32 × 2	33 × 2	34 × 2	35 × 2	36 × 2
37 × 2	38 × 2	39 × 2	40 × 2	41 × 2
42 × 2	43 × 2	44 × 2	24 × 2	25 × 2

Drill as in Exercise CCXXII.

CCXLII.

Mental.

If 3 bushels of oats are required for a horse in 1 week, how many bushels would be necessary for 7 weeks? For 17 weeks? For 27 weeks? — If 3 bushels for 1 horse, 1 week, how many bushels for 9 horses in the same time? For 19 horses? For 29 horses? — If 3 bushels for 1 horse, 1 week, how many bushels for 2 horses, 2 weeks? 2 horses, 8 weeks? 2 horses, 12 weeks? 2 horses, 14 weeks? — If 3 bushels for 1 horse, 1 week, how many bushels for 5 horses, 1 week? 5 horses, 3 weeks? 5 horses, 4 weeks? 5 horses, 5 weeks?

At 7 dollars for 1 hat, how many dollars would 3 hats cost? 7 hats? 9 hats? 12 hats?

What is 5 times the sum of 5 and 12, less 6 times the difference between 27 and 41?

In a term of 9 weeks, how many school-days at 5 days a week? In a term of 11 weeks? Of 10 weeks? Of 12 weeks? Of 14 weeks? Of 13 weeks? Of 15 weeks?

12 things make a dozen: how many things are there in 5 dozen? In 6 dozen? In 7 dozen?

Bought 3 pounds of beefsteak at 28 cents a pound, how many cents did I pay?

Bought 4 pounds of sugar at 16 cents a pound, and 2 pounds at 12 cents a pound: how much did the whole cost?

Mrs. Neff bought 6 yards of silk at 4 dollars a yard, 5 yards poplin at 2 dollars a yard, 3 shawls at 6 dollars each, 7 yards of lace at 4 dollars a yard: how much did she expend?

Reproduce.

CCXLIII.

Count by elevens, from 1 to 89, 2 to 79, 3 to 80, 4 to 81, 5 to 82, 6 to 83, 7 to 84, 8 to 85, 9 to 86, 10 to 87, 11 to 88, and backward.

Write the following divisions:

$$\text{FORM: } 4 \div 2 = 2$$

$$10 \div 5 = 2$$

$$16 \div 4 = 4$$

How many times is 7 contained in 84? in 77? in 70? in 63? in 56? in 49? in 42? in 35? in 28? in 21? in 14? in 7?

8, in 88? in 80? in 72? in 64? in 56? in 48? in 40? in 32? in 24? in 16? in 8?

9, in 81? in 72? in 63? in 54? in 45? in 36? in 27? in 18? in 9?

10, in 80? in 70? in 60? in 50? in 40? in 30? in 20? in 10?

11, in 88? in 77? in 66? in 55? in 44? in 33? in 22? in 11?

12, in 84? in 72? in 60? in 48? in 36? in 24? in 12?

6, in 72? in 66? in 60? in 54? in 48? in 42? in 36? in 30? in 24? in 18? in 12? in 6?

Drill as in Exercise CIII.

CCXLIV.

Count by twelves, 1 to 85, 2 to 86, 3 to 87, 4 to 88, 5 to 89, 6 to 78, 7 to 79, 8 to 80, 9 to 81, 10 to 82, 11 to 83, 12 to 84, and backward.

Write the following divisions, the dividend above the divisor, with a line drawn between:

FORM: $\frac{1}{2} = 2$ $\frac{1}{8} = 2$ $\frac{1}{4} = 4$

Divide 88 by 8; 88 by 11; 84 by 7; 84 by 12; 81 by 9; 80 by 8; 80 by 10; 77 by 7; 77 by 11; 72 by 6; 72 by 8; 72 by 9; 72 by 12; 70 by 10; 70 by 7; 66 by 6; 66 by 11; 64 by 8; 63 by 7; 63 by 9; 60 by 5; 60 by 6; 60 by 10; 60 by 12; 56 by 7; 56 by 8; 55 by 5; 55 by 11; 54 by 6; 54 by 9; 50 by 5; 50 by 10; 49 by 7; 48 by 4; 48 by 6; 48 by 8; 48 by 12; 45 by 5; 45 by 9; 44 by 4; 44 by 11; 42 by 6; 42 by 7; 40 by 4; 40 by 10; 40 by 5; 40 by 8; 36 by 3; 36 by 4; 36 by 6; 36 by 9; 36 by 12.

Drill as in Exercise CIII.

CCXLV.

Write as in Exercise CCXLIV.

Divide 88 by 2; 88 by 4; 88 by 22; 88 by 44; 87 by 3; 87 by 29; 86 by 2; 86 by 43; 85 by 5; 85 by 17; 84 by 2; 84 by 3; 84 by 4; 84 by 6; 84 by 14; 84 by 21; 84 by 28; 84 by 42; 82 by 2; 82 by 41; 81 by 3; 81 by 27; 80 by 2; 80 by 4; 80 by 5; 80 by 16; 80 by 20; 80 by 40.

Drill as in Exercise CIII.

CCXLVI.

Mental.

A smith in a certain number of days had fully shod a number of horses. He had used 88 shoes: how many horses had he shod?

A man travelled 87 miles in 3 days: how many miles a day had he travelled?

10 cents make 1 dime: how many dimes in 80 cents? In 60 cents? In 50? In 70?

When salt was 5 cents a quart, how many quarts could be bought for 85 cents? For 75 cents? For 65 cents? For 80 cents? For 70 cents? For 60 cents?

$$5, + 7, + 9, \times 4, \div 3, - 3, \div 5, \times 9, + 40.$$

$$6, + 19, \div 5, + 22, + 9, \div 3, \times 7.$$

$$11, + 12, + 9, \div 4, \times 8, + 1, \div 5, \times 6.$$

A fence requires the labor of 4 men 3 days for 6 hours a day to build it. How long would it take 1 man to build it, if he worked 6 hours a day? If he worked 8 hours a day? How long would it take 2 men, working 6 hours a day?

A fruit-woman sold 5 oranges at 3 cents apiece, 7 oranges at 4 cents apiece, 6 oranges at 5 cents apiece, and 2 oranges at 6 cents apiece. She found that she had gained 25 cents: what did she *pay* apiece for the oranges?

Two men travel in the same direction: one goes in a buggy 7 miles an hour, the other on foot at 4 miles an hour. How many hours would they have travelled when 33 miles apart? How far? How many hours, if they travelled in opposite directions? How far?

Reproduce.

CHAPTER THE TENTH.

Ninety to Ninety-nine.

CCXLVII.

39. $89 + 1 = 80 + (9 + 1) = 80 + 10 = 8 \text{ Tens} + 1 \text{ Ten} = 9 \text{ Tens}$. For 9 Tens, we write 9 in the second place, thus: 90, which we read *Ninety*. $90 + 1$, we write 91, the 9 being *Ninety*, the 1, *One*. In letters, for 90 we write XC;

and for the numbers following to 99, add the letters appropriate to the units.

Write the following table upon the blackboard :

Ninety = 9 Tens + Nothing,	XC	90
Ninety-one = 9 Tens + One,	XCI	91
Ninety-two = 9 Tens + Two,	XCII	92
Ninety-three = 9 Tens + Three,	XCIII	93
Ninety-four = 9 Tens + Four,	XCIV	94
Ninety-five = 9 Tens + Five,	XCV	95
Ninety-six = 9 Tens + Six,	XCVI	96
Ninety-seven = 9 Tens + Seven,	XCVII	97
Ninety-eight = 9 Tens + Eight,	XCVIII	98
Ninety-nine = 9 Tens + Nine,	XCIX	99

Drill as in Exercise XXXVI.

CCXLVIII.

Read the following numbers :

81, 92, 79, 90, 83, 70, 95, 91, 63, 80, 81, 93, 78, 96, 87, 97, 89, 85, 82, 98, 94, 88, 99, 86. XC, LXXXIII, XCI, LXXX, XCIII, XCII, LXXXVII, XCIV, LXXXI, XCV, LXXXIX, XCVI, LXXXII, XCVII, LXXXV, XCVIII, XCIX, LXXXIV, LXXXVIII, LXXXVI.

Drill as in Exercise XXXVII. For what does 9 stand in the 1st place? in the 2d? 8? 7? 6? 5? 4? 3? 2? 1?

CCXLIX.

Write the following numbers, in letters and figures :

Eighty	Ninety	Eighty-one	Ninety-one
Eighty-two	Ninety-two	Eighty-three	Ninety-three
Eighty-four	Ninety-four	Eighty-five	Ninety-five
Eighty-six	Ninety-six	Eighty-seven	Ninety-seven
Eighty-eight	Ninety-eight	Eighty-nine	Ninety-nine

Vary and continue the exercise, until each pupil writes neatly and promptly every number up to 99. Analyze and read.

CCL.

Count from 1 to 99, and by twos, 1 to 99, 2 to 98, and backward.

Write the following additions :

$$\begin{array}{l} \text{FORM:} \quad 11 + 3 = 14 \\ \quad \quad 17 + 2 = 19 \\ \quad \quad 14 + 4 = 18 \end{array}$$

Add 89 and 1; 90 and 1; 91 and 1; 92 and 1; 93 and 1; 94 and 1; 95 and 1; 96 and 1; 97 and 1; 98 and 1; 88 and 2; 90 and 2; 92 and 2; 94 and 2; 96 and 2; 89 and 2; 91 and 2; 93 and 2; 95 and 2; 97 and 2; 87 and 3; 90 and 3; 93 and 3; 96 and 3; 88 and 3; 91 and 3; 94 and 3; 89 and 3; 92 and 3; 95 and 3; 86 and 4; 90 and 4; 94 and 4; 87 and 4; 91 and 4; 95 and 4; 88 and 4; 92 and 4; 89 and 4; 93 and 4; 85 and 5; 90 and 5; 86 and 5; 91 and 5; 87 and 5; 92 and 5; 88 and 5; 93 and 5; 89 and 5; 94 and 5.

Drill as in Exercise CX.

CCLI.

Count by threes, from 1 to 97, 2 to 98, 3 to 99, and backward.

Write as in Exercise CCL.

Add 84 and 6; 90 and 6; 85 and 6; 91 and 6; 86 and 6; 92 and 6; 87 and 6; 93 and 6; 88 and 6; 89 and 6; 83 and 7; 90 and 7; 84 and 7; 91 and 7; 85 and 7; 92 and 7; 86 and 7; 87 and 7; 88 and 7; 89 and 7; 82 and 8; 90 and 8; 83 and 8; 91 and 8; 84 and 8; 85 and 8; 86 and 8; 87 and 8; 88 and 8; 89 and 8; 81 and 9; 90 and 9; 82 and 9; 83 and 9; 84 and 9; 85 and 9; 86 and 9; 87 and 9; 88 and 9; 89 and 9.

Drill as in Exercise CX.

CCLII.

Count by fours, 1 to 97, 2 to 98, 3 to 99, 4 to 96, and backward.

Write as in Exercise CCL.

80 + 1	90 + 1	81 + 1	91 + 1
82 + 1	92 + 1	83 + 1	93 + 1
84 + 1	94 + 1	85 + 1	95 + 1
86 + 1	96 + 1	87 + 1	97 + 1
88 + 1	98 + 1	89 + 1	80 + 2
90 + 2	81 + 2	91 + 2	82 + 2
92 + 2	83 + 2	93 + 2	84 + 2
94 + 2	85 + 2	95 + 2	86 + 2
96 + 2	87 + 2	97 + 2	88 + 2
89 + 2	80 + 3	90 + 3	81 + 3
91 + 3	82 + 3	92 + 3	83 + 3
93 + 3	84 + 3	94 + 3	85 + 3
95 + 3	86 + 3	96 + 3	87 + 3
88 + 3	89 + 3	80 + 4	90 + 4
81 + 4	91 + 4	82 + 4	92 + 4
83 + 4	93 + 4	84 + 4	94 + 4
85 + 4	95 + 4	86 + 4	87 + 4
88 + 4	89 + 4	79 + 4	78 + 3

Drill as in Exercise CX.

CCLIII.

Count by fives, 1 to 96, 2 to 97, 3 to 98, 4 to 99, 5 to 95, and backward.

Write as in Exercise CCL.

80 + 5	90 + 5	81 + 5	91 + 5
82 + 5	92 + 5	83 + 5	93 + 5
84 + 5	94 + 5	85 + 5	86 + 5
87 + 5	88 + 5	89 + 5	80 + 6

90 + 6	81 + 6	91 + 6	82 + 6
92 + 6	83 + 6	93 + 6	84 + 6
85 + 6	86 + 6	87 + 6	88 + 6
89 + 6	80 + 7	90 + 7	81 + 7
91 + 7	81 + 8	91 + 8	82 + 8
83 + 8	84 + 8	85 + 8	86 + 8
87 + 8	88 + 8	89 + 8	80 + 9
90 + 9	81 + 9	82 + 9	83 + 9
84 + 9	85 + 9	86 + 9	87 + 9
88 + 9	89 + 9	75 + 9	67 + 9

Drill as in Exercise CX.

CCLIV.

Count by sixes, 1 to 97, 2 to 98, 3 to 99, 4 to 94, 5 to 95, 6 to 96, and backward.

Write the following groups of numbers, in columns, the amount below, separated by a line.

13 + 24 + 5 + 16 + 17 + 18
 24 + 15 + 16 + 17 + 8 + 19
 15 + 16 + 17 + 8 + 19 + 19
 16 + 17 + 18 + 19 + 19 + 9
 18 + 19 + 19 + 19 + 9 + 9
 19 + 19 + 9 + 19 + 9 + 19
 18 + 18 + 18 + 8 + 18 + 18
 17 + 27 + 17 + 7 + 17 + 7
 13 + 16 + 18 + 14 + 15 + 19
 13 + 17 + 19 + 13 + 17 + 14
 23 + 18 + 19 + 14 + 7 + 15
 13 + 19 + 15 + 17 + 14 + 18
 14 + 15 + 18 + 14 + 13 + 19
 14 + 16 + 18 + 17 + 17 + 15
 14 + 17 + 7 + 18 + 18 + 19
 14 + 18 + 16 + 17 + 14 + 16
 14 + 19 + 18 + 15 + 18 + 14

15 + 15 + 16 + 16 + 17 + 17
 15 + 16 + 15 + 16 + 15 + 16
 15 + 17 + 16 + 16 + 8 + 18
 15 + 18 + 7 + 15 + 16 + 19
 15 + 9 + 16 + 18 + 17 + 17
 16 + 18 + 7 + 19 + 15 + 17
 16 + 9 + 18 + 16 + 14 + 18
 17 + 26 + 14 + 7 + 18 + 17
 17 + 19 + 15 + 18 + 7 + 19

Drill as in Exercise CXVI.

CCLV.

Count by sevens, 1 to 99, 2 to 98, 3 to 94, 4 to 95, 5 to 96, 6 to 97, 7 to 98, and backward.

Write as in Exercise CCLIV.

82 + 23 + 24 + 18	27 + 32 + 18 + 21
15 + 26 + 45 + 13	21 + 19 + 39 + 18
10 + 47 + 22 + 20	12 + 24 + 38 + 24
23 + 27 + 16 + 33	24 + 15 + 38 + 22
17 + 27 + 23 + 28	16 + 36 + 33 + 12
25 + 14 + 27 + 31	25 + 25 + 37 + 10
14 + 37 + 28 + 18	23 + 23 + 37 + 15
10 + 27 + 32 + 27	21 + 16 + 22 + 36
16 + 12 + 39 + 29	17 + 34 + 25 + 23
14 + 15 + 28 + 35	16 + 26 + 35 + 14
17 + 11 + 40 + 27	13 + 27 + 34 + 24
18 + 28 + 28 + 18	19 + 19 + 39 + 19
25 + 25 + 24 + 25	24 + 24 + 24 + 24
23 + 23 + 23 + 23	24 + 34 + 20 + 15
16 + 26 + 16 + 32	12 + 22 + 49 + 12
13 + 34 + 25 + 23	14 + 15 + 16 + 45
15 + 26 + 17 + 40	22 + 24 + 25 + 27
16 + 19 + 39 + 17	26 + 21 + 29 + 19

Drill as in Exercise CXVI.

CCLVI.

Mental.

In the several months of the year there are the following number of days :

Spring.	Summer.	Autumn.	Winter.
March, 31	June, 30	September, 30	December, 31
April, 30	July, 31	October, 31	January, 31
May, 31	August, 31	November, 30	February, 28
How many days in the Spring? In the Summer? In the Autumn? In the Winter?			

A gentleman left his home, and walked 15 miles on the first day ; 17 miles on the second day ; 13 miles on the third day, reaching a town where he stopped a few days. Returning by another road, he walked 12 miles on the first day ; 14 miles on the second day ; 13 miles on the third day, reaching home. How many miles did he travel altogether? How many miles going from home? Returning home? Which was the shorter road? How much?

Add together four numbers : the first is 23 ; the second, 13 ; the third, 10 ; the third, = the first, + the second, + the third.

How many yards are there in three pieces of cloth, one containing 29 yards, one, 27 yards, and one, 39 yards?

In a certain school are 39 boys and 58 girls : how many scholars in all?

$$27, + 37, - 18, + 16, - 8, \div 9, \times 12, + 19, = ?$$

$$19, + 23, - 13, + 7, \div 6, \times 7, \times 2, + 8, = ?$$

$$28, + 7, \div 7, \times 15, + 18, = ?$$

$$36, + 17, - 4, \div 7, \times 12, + 6, \div 10, \times 9, + 15, = ?$$

$$25, + 24, - 15, + 14, + 16, \div 8, \times 7, + 17, + 22, = ?$$

$$15, + 18, + 26, + 17, + 18, - 19, \div 5, \times 6, = ?$$

Reproduce.

CCLVII.

Count by eights, 1 to 97, 2 to 98, 3 to 99, 4 to 92, 5 to 93, 6 to 94, 7 to 95, 8 to 96, and backward.

Write the following subtractions, the subtrahend underneath the minuend, and below them the remainder, separated by a line.

98 — 49	97 — 38	97 — 59	96 — 67
96 — 79	96 — 58	95 — 76	95 — 69
95 — 57	95 — 48	94 — 39	94 — 25
94 — 18	94 — 26	94 — 37	93 — 49
93 — 54	93 — 68	93 — 75	93 — 67
93 — 56	92 — 49	92 — 33	92 — 28
92 — 14	92 — 27	92 — 35	92 — 46
91 — 59	91 — 62	91 — 78	91 — 33
91 — 77	91 — 64	91 — 56	91 — 43
90 — 39	90 — 21	90 — 18	90 — 22
90 — 37	90 — 43	90 — 56	90 — 64
90 — 75	88 — 39	87 — 29	87 — 38

Drill as in Exercise XCIV.

CCLVIII.

Mental.

A mercer, having 98 pieces of a certain kind of cloth, sold to one customer, 7 pieces ; to another, 9 pieces ; to another, 6 pieces ; to another, 8 pieces. He then purchased 15 pieces more ; and again sold, to one customer, 14 pieces ; to another, 11 pieces ; to another, 7 pieces ; to another, 12 pieces. He then purchased 10 pieces more ; and again sold, to one customer, 13 pieces ; to another, 7 pieces ; to another, 5 pieces. How many pieces had he after each sale and purchase ? How many did he sell in all ?

A gentleman, having in his purse 90 dollars, gave his wife

25 dollars, and his daughter 17 dollars : how many dollars did he give both? and how much had he left?

When Dr. Franklin died (in 1790), he was 84 years of age; at the same time President Washington was 58 years old: how old was Franklin, when Washington was born?

If a merchant buys an article for 75 dollars, and sells it for 94 dollars, how much did he gain? If he sells it for 84 dollars? For 87 dollars? For 96 dollars? For 86 dollars? For 95 dollars? For 93 dollars? What does he sell it for, if he loses 6 dollars? If he loses 8 dollars?

The minuend = 96, the subtrahend = 27, the difference = ?
 The difference = 69, the subtrahend = 27, the minuend = ?
 The difference = 17, the minuend = 78, the subtrahend = ?

Reproduce.

CCLIX.

Count by nines, 1 to 91, 2 to 92, 3 to 93, 4 to 94, 5 to 95, 6 to 96, 7 to 97, 8 to 98, 9 to 99, and backward.

Write the following multiplications, in a neat table:

FORM: $1 \times 2 = 2$, $1 \times 3 = 3$, $1 \times 4 = 4$.

2 times 8 are how many? 3 times 8? 4 times 8? 5 times 8? 6 times 8? 7 times 8? 8 times 8? 9 times 8? 10 times 8? 11 times 8? 12 times 8? (Add 12 Eights.)

2 times 9? 3 times 9? 4 times 9? 5 times 9? 6 times 9? 7 times 9? 8 times 9? 9 times 9? 10 times 9? (Add 10 Nines.) 11 times 9? (Add 11 Nines.)

2 times 10? 3 times 10? 4 times 10? 5 times 10? 6 times 10? 7 times 10? 8 times 10? 9 times 10? (Add 9 Tens.)

2 times 11? 3 times 11? 4 times 11? 5 times 11? 6 times 11? 7 times 11? 8 times 11? 9 times 11? (Add 9 Elevens.)

2 times 12? 3 times 12? 4 times 12? 5 times 12? 6 times 12? 7 times 12? 8 times 12? (Add 8 Twelves.)

Drill as in Exercise C.

CCLX.

Count by tens, 1 to 91, 2 to 92, 3 to 93, 4 to 94, 5 to 95, 6 to 96, 7 to 97, 8 to 98, 9 to 99, and backward.

Write the following multiplications, the multiplier under the multiplicand, the product underneath, separated by a line: always units under units, &c.

13×6	14×6	15×6	16×6
13×7	14×7	13×5	14×5
15×5	16×5	17×5	18×5
19×5	13×4	14×4	15×4
16×4	17×4	18×4	19×4
20×4	21×4	22×4	23×4
24×4	13×3	14×3	15×3
16×3	17×3	18×3	19×3
20×3	21×3	22×3	23×3
24×3	25×3	26×3	27×3
28×3	29×3	30×3	31×3
32×3	33×3	33×2	34×2
35×2	36×2	37×2	38×2
39×2	40×2	41×2	42×2
43×2	44×2	45×2	46×2
47×2	48×2	49×2	

Drill as in Exercise CCXXII.

CCLXI.

Mental.

There are 2 halves in 1 whole one: how many halves are there in 10 whole ones? In 20? In 22? In 27? In 35? In 47? In 9? In 19? In 29? In 39? In 49?

There are 3 thirds in 1 whole one: how many thirds are there in 7 whole ones? In 10? In 20? In 22? In 24? In 27? In 31? In 33.

A farmer sells his sheep, of which he has 19, at 5 dollars each: what does he get for his flock?

An orchardist has 7 trees, each of which produces 14 bushels of apples: how many do they all produce?

How many days in 1 week? How many in 2 weeks? How many in 7 weeks? In 9 weeks? In 13 weeks?

If 9 men can do a piece of work in 11 days, how long will it take 1 man to do it? If 9 men do it in 9 days, how long will it take 1 man to do it?

Two men starting at the same time, travel in the same direction: one goes 7 miles an hour, the other, 4 miles an hour. How far do they travel in 9 hours? How far apart are they? How far apart would they be if they travel in opposite directions?

What is the cost of 4 pounds of beef at 23 cents a pound? At 24 cents? At 22 cents? At 21 cents? At 19 cents?

What must be paid for 2 pounds of butter at 47 cents per pound? At 43 cents per pound? At 46 cents? At 48 cents? At 45 cents? At 44 cents?

Reproduce.

CCLXII.

Count by elevens, 1 to 89, 2 to 90, 3 to 91, 4 to 92, 5 to 93, 6 to 94, 7 to 95, 8 to 96, 9 to 97, 10 to 98, 11 to 99, and backward.

Write the following divisions:

FORM: $4 \div 2 = 2$, $10 \div 5 = 2$, $16 \div 4 = 4$.

How many times is 7 contained in 84? in 77? in 70? in 63? in 56? in 49? in 42? in 35? in 28? in 21? in 14? in 7?

8, in 96? in 88? in 80? in 72? in 64? in 56? in 48? in 40? in 32? in 24? in 16? in 8?

9, in 99? in 90? in 81? in 72? in 63? in 54? in 45? in 36? in 27? in 18? in 9?

10, in 90? in 80? in 70? in 60? in 50? in 40? in 30? in 20? in 10?

11, in 99? in 88? in 77? in 66? in 55? in 44? in 33? in 22? in 11?

12, in 96? in 84? in 72? in 60? in 48? in 36? in 24? in 12?

Drill as in Exercise CIII.

CCLXIII.

Count by twelves, 1 to 97, 2 to 98, 3 to 99, 4 to 88, 5 to 89, 6 to 90, 7 to 91, 8 to 92, 9 to 93, 10 to 94, 11 to 95, 12 to 96, and backward.

Write the following divisions, the dividend above the divisor with a line drawn between:

FORM: $\frac{4}{2} = 2$, $\frac{18}{9} = 2$, $\frac{12}{3} = 4$.

Divide 99 by 9; 99 by 11; 96 by 8; 96 by 12; 90 by 9; 90 by 10; 88 by 8; 88 by 11; 84 by 7; 84 by 12; 81 by 9; 80 by 8; 80 by 10; 77 by 7; 77 by 11; 72 by 6; 72 by 8; 72 by 9; 72 by 12; 70 by 7; 70 by 10; 66 by 6; 66 by 11; 64 by 8; 63 by 7; 63 by 9; 60 by 5; 60 by 6; 60 by 10; 60 by 12; 56 by 7; 56 by 8; 55 by 5; 55 by 11; 54 by 6; 54 by 9; 50 by 5; 50 by 10; 49 by 7; 48 by 4; 48 by 6; 48 by 8; 48 by 12; 45 by 5; 45 by 9; 44 by 4; 44 by 11; 42 by 6; 42 by 7; 40 by 5; 40 by 8.

Drill as in Exercise CIII.

CCLXIV.

Mental.

One man can do a piece of work in 96 days: in how many days would 2 men do it? Would 12 men? Would 3 men? Would 8 men? Would 4 men? Would 6 men?

How many cents make a dime? How many dimes in 10 cents? In 90 cents? In 20 cents? In 80 cents? In 30 cents? In 70 cents? In 40 cents? In 60 cents? In 50 cents?

12 inches make 1 foot: how many feet in 96 inches? In 24 inches? In 84 inches? In 36 inches? In 72 inches? In 60 inches? In 48 inches?

9 square feet make 1 square yard: how many square yards in 99 square feet? In 18 square feet? In 90 square feet? In 27 square feet? In 81 square feet? In 36 square feet? In 72 square feet? In 45 square feet? In 63 square feet? In 54 square feet?

A gentleman with a farm of 84 acres, would divide it into 7 lots of equal size: how many acres in each?

If it takes 5 bushels of wheat to make a barrel of flour, how many barrels could be made of 10 bushels? Of 60 bushels? Of 40 bushels? Of 80 bushels? Of 45 bushels? Of 90 bushels?

If a man spend 4 dollars in a day, how long would 28 dollars last? 56 dollars? 84 dollars?

Reproduce.

CHAPTER THE ELEVENTH.

Numbers of Three Places.

CCLXV.

What is the largest number that can be written with one figure? What is the largest number expressed by one figure in the second place? What is the largest number that can be written by two figures?

40. $99 + 1 = 90 + (9 + 1) = 90 + 10 = 9 \text{ tens} + 1 \text{ ten} = 10 \text{ tens}$. But we cannot write 10 tens in the second place:

so, we make a new use of our figures by beginning the series in the third place. 1 in the third place stands for 1 hundred = 10 tens. $99 + 1 = 10$ tens, we therefore write 100, which we read *One hundred*. 20 tens = 200, or *Two hundred*. Either figure in the third place stands for so many hundreds, as in the second place it stands for so many tens, and in the first or right-hand place for so many units, or ones.

41. 10 units make 1 ten: 10 tens 1 hundred.

How many units in 2 tens? How many in 9 tens? What is meant by the word *units*? How many units in 1 hundred? In 2 hundreds? In 9 hundreds? In 3 tens? In 8 tens? In 3 hundreds? In 8 hundreds? In 4 tens? In 4 hundreds? In 7 tens? In 7 hundreds? In 5 tens? In 5 hundreds? In 6 tens? In 6 hundreds?—How many tens in 1 hundred? In 9 hundreds? In 2 hundreds? In 8 hundreds? In 3 hundreds? In 7 hundreds? In 4 hundreds? In 6 hundreds? In 5 hundreds? How many tens in 1 hundred, and 2 tens? In 2 hundreds, and 5 tens? In 3 hundreds, and 7 tens? In 4 hundreds, and 3 tens? In 5 hundreds, and 1 ten? In 6 hundreds, and 9 tens? In 7 hundreds, and 8 tens? In 8 hundreds, and 4 tens? In 9 hundreds, and 6 tens?—How many units in 6 tens and 6 units? In 1 hundred, 9 tens, and 2 units? In 2 hundreds, and 7 units? In 3 hundreds, and 1 ten? In 4 hundreds, 7 tens, and 9 units? In 5 hundreds, 5 tens, and 5 units? In 6 hundreds, 2 tens, and 4 units? In 7 hundreds, 8 tens, and 1 unit? In 8 hundreds, 3 tens, and 8 units? In 9 hundreds, 4 tens, and 8 units?

CCLXVI.

42. In writing and reading numbers, we always begin at the left hand: in calculating their value at the right hand.

The teacher puts upon the blackboard several numbers of three places, demanding, In what place is this figure? and this? and this? and this? &c. In this number which figure is in the second place? in the third place? in the first place? In this? &c. The object is to fix the habit of numbering or naming the places correctly.

43. Vacant places are to be filled with ciphers.

Write numbers, in lines and columns, as follows :

8 in the third place, 2 in the second, 7 in the first.

8 in the third place.

8 in the third place, 7 in the first.

2 in the second place, 8 in the first.

1 in the third place, 7 in the second, 5 in the first.

9 in the second place.

8 in the third place, 4 in the second.

5 in the third place, 5 in the first.

4 in the third place, 4 in the second, 4 in the first.

2 in the third place, 2 in the first.

2 in the second place, 2 in the first.

8 in the third place, 6 in the second, 9 in the first.

6 in the third place, 3 in the second, 1 in the first.

7 in the third place, 1 in the second, 3 in the first.

9 in the third place, 5 in the second, 6 in the first.

8 in the second place.

DRILL: Read each number as written. Analyze each number, as 327, 8 hundreds, 2 tens, 7 units, &c. If a cipher occupies a place, the pupil is to treat it as *nothing*, and therefore is not to name it.

CCLXVII.

For what does 8 stand in the first place, or alone? in the second place? in the third place? 0, in the second place? in the first? in the third? 3, in the third place? in the first? in the second? 5, in the first place? in the third? in the second? 9, in the second place? in the third? in the first? 1, in the third place? in the second? in the first?

7, in the first place? in the second? in the third? 2, in the second place? in the first? in the third? 4, in the third place? in the second? in the first?

Analyze and read the following numbers :

5; 50; 55; 500; 505; 555; 550; 7; 70; 77; 700; 707; 777; 770; 3; 30; 33; 300; 303; 333; 330; 1; 10; 11; 100; 101; 111; 110; 9; 90; 99; 900; 909; 999; 990; 2; 20; 22; 200; 202; 222; 220; 8; 80; 88; 800; 808; 888; 880; 4; 40; 44; 400; 404; 444; 440; 6; 60; 66; 600; 606; 666; 660; 12; 345; 678; 903; 230; 45; 607; 80; 115.

Drill as in Exercise CCLXVI.

CCLXVIII.

In *reckoning* numbers, with which place do we begin? In *reading* numbers, at which hand do we begin? In *writing* numbers, where do we begin? In writing 86, which figure will you write first? Which place is that figure in? In writing numbers of two places, which do we write first — the units or the tens? Write seventy-four: which place did you fill first? In writing numbers of three places, which will you first fill? Name the three places, in the order of calculating, or reckoning. Name the three places, in the order of reading. Name them in the order of writing.

Write the following numbers :

Eight; Eighty; Eight hundred; Eight hundred and eight; Eight hundred and Eighty-eight; One; Ten; One hundred; Eleven; One hundred and one; One hundred and eleven; Two; Twenty-two; Two hundred; Two hundred and twenty-two; Three; Thirty; Three hundred; Three hundred and three; Three hundred and thirty-three; Five; Fifty; Five hundred; Five hundred and five; Five hundred and fifty-five; Seven; Seventy; Seven hundred; Seven hun-

dred and seven; Seven hundred and seventy-seven; Four; Forty; Four hundred; Four hundred and four; Four hundred and forty; Six; Sixty; Six hundred; Six hundred and sixty-six; Nine; Ninety; Nine hundred; Nine hundred and nine; Nine hundred and ninety-nine.

Drill as in Exercise CCLXVI.

CCLXIX.

44. To represent 100, by a letter, we use a capital C; 200, CC; 300, CCC; 400, CCCC. 500 is represented by a single letter, D; 600, by DC; 700, DCC; 800, DCCC; 900, DCCCC.

Write in letters, 100; 500; 200; 600; 300; 700; 400; 800; 900.

45. To represent numbers of three places by letters, first write the letters proper for the hundreds, then those for the tens, then those for the units.

Thus, if I am to write 999, I write down first the 900, DCCCC; then the 90, XC; then the 9, IX: the whole is DCCCCXCIX = 999.

Read the following numbers:

I; V; L; C; X; D; CI; CV; CX; CL; XC; CC; CCCC; DC; CXX; CLX; CXLXX; CCCIX; CCCXI; CCCCXLIV; DCLXVI; DCCC; DLV; DCCLXX; DCCCCLXXXVIII; CCLXXV; DXL; DCCCLXIX.

Write in letters, 157; 273; 346; 429; 514; 631; 762; 895; 988; 104; 140; 207; 270; 306; 360; 405; 450; 503; 530; 601; 610; 709; 790; 802; 820; 908; 980.

CCLXX.

Count by 1 to 101, and backward.

Write the following additions:

$$\begin{array}{rcl} \text{Form:} & 11 + 3 & = 14 \\ & 17 + 2 & = 19 \end{array}$$

Add 99 and 1; 100 and 1; 101 and 1; 102 and 1; 103 and 1; 104 and 1; 105 and 1; 106 and 1; 107 and 1; 108 and 1; 109 and 1; 98 and 2; 100 and 2; 102 and 2; 104 and 2; 106 and 2; 108 and 2; 99 and 2; 101 and 2; 103 and 2; 105 and 2; 107 and 2; 109 and 2; 97 and 3; 100 and 3; 103 and 3; 106 and 3; 109 and 3; 98 and 3; 101 and 3; 104 and 3; 107 and 3; 99 and 3; 102 and 3; 105 and 3; 108 and 3; 96 and 4; 100 and 4; 104 and 4; 108 and 4; 97 and 4; 101 and 4; 105 and 4; 109 and 4; 98 and 4; 102 and 4; 106 and 4; 99 and 4; 103 and 4; 107 and 4; 95 and 5; 100 and 5; 105 and 5; 96 and 5; 101 and 5; 106 and 5; 97 and 5; 102 and 5; 107 and 5; 98 and 5; 103 and 5; 108 and 5; 99 and 5; 104 and 5; 109 and 5.

Drill as in Exercise CX.

CCLXI.

Count by twos, 1 to 101, 2 to 102, and backward.

Write as in Exercise CCLXX.

Add 94 and 6; 100 and 6; 106 and 6; 95 and 6; 101 and 6; 107 and 6; 96 and 6; 102 and 6; 108 and 6; 97 and 6; 103 and 6; 109 and 6; 98 and 6; 104 and 6; 99 and 6; 105 and 6; 93 and 7; 100 and 7; 107 and 7; 94 and 7; 101 and 7; 108 and 7; 95 and 7; 102 and 7; 109 and 7; 96 and 7; 103 and 7; 97 and 7; 104 and 7; 98 and 7; 105 and 7; 99 and 7; 106 and 7; 92 and 8; 100 and 8; 108 and 8; 93 and 8; 101 and 8; 109 and 8; 94 and 8; 102 and 8; 95 and 8; 103 and 8; 96 and 8; 104 and 8; 97 and 8; 105 and 8; 98 and 8; 106 and 8; 99 and 8; 107 and 8; 91 and 9; 100 and 9; 109 and 9; 92 and 9; 101 and 9; 93 and 9; 102 and 9; 94 and 9; 103 and 9; 95 and 9; 104 and 9; 96 and 9; 105 and 9; 97 and 9; 106 and 9; 98 and 9; 107 and 9; 99 and 9; 108 and 9.

Drill as in Exercise CX.

CCLXXII.

Count by threes, 1 to 100, 2 to 101, 3 to 102, and backward.

Write as in Exercise CCXXIII.

92 + 8	102 + 8	92 + 9	102 + 9
91 + 9	101 + 9	93 + 7	103 + 7
93 + 8	103 + 8	93 + 9	103 + 9
94 + 6	104 + 6	94 + 7	104 + 7
94 + 8	104 + 8	94 + 9	104 + 9
95 + 5	105 + 5	95 + 6	105 + 6
95 + 7	105 + 7	95 + 8	105 + 8
95 + 9	105 + 9	96 + 4	106 + 4
96 + 5	106 + 5	96 + 6	106 + 6
96 + 7	106 + 7	96 + 8	106 + 8
96 + 9	106 + 9	97 + 3	107 + 3
97 + 4	107 + 4	97 + 5	107 + 5
97 + 6	107 + 6	97 + 7	107 + 7
97 + 8	107 + 8	97 + 9	107 + 9
98 + 2	108 + 2	98 + 3	108 + 3
98 + 4	108 + 4	98 + 5	108 + 5
98 + 6	108 + 6	98 + 7	108 + 7
98 + 8	108 + 8	98 + 9	108 + 9
99 + 1	109 + 1	99 + 2	109 + 2
99 + 3	109 + 3	99 + 4	109 + 4
99 + 5	109 + 5	99 + 6	109 + 6
99 + 7	109 + 7	99 + 8	109 + 8
99 + 9	109 + 9	111 + 9	112 + 8
112 + 9	113 + 7	113 + 8	113 + 9
114 + 6	114 + 7	114 + 8	114 + 9
115 + 5	115 + 6	115 + 7	115 + 8
115 + 9	116 + 4	116 + 5	116 + 6
116 + 7	116 + 8	116 + 9	117 + 8

Drill as in Exercise CX.

CCLXXIII.

Count by fours, 1 to 101, 2 to 102, 3 to 103, 4 to 104, and backward.

Add the following numbers :

132	27	115	121	210	102
13	247	175	54	115	23
132	26	119	47	14	207
156	169	249	178	24	18
45	209	22	208	116	208
48	27	154	18	121	103
218	207	124	233	222	207
<u>216</u>	<u>12</u>	<u>37</u>	<u>94</u>	<u>87</u>	<u>55</u>
43	13	109	217	68	107
48	168	75	139	108	127
203	78	66	27	46	157
206	119	77	187	203	37
26	25	309	59	86	57
308	204	208	128	215	217
106	219	38	135	149	127
<u>24</u>	<u>78</u>	<u>86</u>	<u>44</u>	<u>57</u>	<u>77</u>
127	68	75	55	146	105
143	119	89	66	57	119
58	72	134	177	119	127
69	45	126	88	128	68
67	36	67	99	134	104
123	117	54	111	59	159
154	86	203	122	49	45
78	158	29	144	144	78
114	164	141	33	60	84
<u>27</u>	<u>35</u>	<u>52</u>	<u>48</u>	<u>78</u>	<u>65</u>

Drill as in Exercise CXVI.

CCLXXIV.

Count by fives, 1 to 101, 2 to 102, 3 to 103, 4 to 104, 5 to 105, and backward.

Add the following columns, writing the amount below :

3	6	9	5	2	1	4	7	8	13	27	39	24	66
7	9	6	4	7	5	6	1	3	26	49	75	65	77
9	5	8	5	4	6	3	4	7	39	66	98	39	56
4	5	9	3	8	6	7	2	4	45	84	25	63	67
6	7	6	7	4	3	1	8	5	52	97	64	78	84
5	6	9	5	7	6	9	9	6	61	75	86	56	93
8	7	8	6	7	7	5	6	2	74	56	33	77	71
2	8	4	3	2	1	4	7	9	87	31	44	22	58
1	8	2	4	3	5	1	7	8	98	13	77	84	95

45	38	52	23	34	115	109	402	317	207
86	27	48	132	146	26	180	17	15	14
89	18	32	46	75	47	17	38	102	191
95	96	84	375	93	339	48	82	90	127
97	87	73	218	16	84	205	25	34	36
86	97	85	85	223	17	22	47	176	214
79	85	91	17	41	122	114	52	28	22
69	96	77	41	217	23	37	116	124	41
96	92	78	22	55	135	291	144	17	121

Drill as in Exercise CXVI.

CCLXXV.

45. Should the sum of the units column exceed 99, and therefore need 3 figures to express it, analyze it; write the units under the units column, and add the tens, including 10 tens for each hundred, to the tens column. The rule is, put every figure in its appropriate place, — units in the units place, tens in the tens place, &c.

Count by sixes, 1 to 103, 2 to 104, 3 to 105, 4 to 106, 5 to 102, and backward.

Add the following columns, writing the amount below :

8	9	9	15	35	42	55	62	77	83	26	92
7	9	5	27	57	29	66	18	22	25	28	23
6	9	3	36	76	18	77	84	19	27	32	35
7	7	5	45	64	74	88	32	18	33	34	57
7	7	5	59	42	39	99	27	17	38	36	47
8	7	3	67	29	62	11	19	26	36	41	73
8	8	3	22	31	45	44	28	25	49	43	32
6	8	8	75	17	19	33	36	28	18	45	29
6	8	8	39	74	87	22	47	37	15	47	27
5	6	9	28	42	16	42	19	16	17	49	71
5	6	5	15	27	53	27	25	19	24	52	11
9	6	3	47	73	22	53	37	22	42	54	19
9	4	7	63	35	47	29	17	35	27	56	29
2	8	6	91	58	37	42	15	47	72	58	17
3	7	6	49	88	48	74	26	58	18	61	27
4	6	8	94	43	49	37	38	66	12	63	16
4	6	7	37	34	52	49	81	92	82	65	26
7	3	4	24	47	38	56	19	17	28	67	18
8	8	7	17	63	57	17	92	16	16	69	38
8	8	7	80	32	16	63	17	14	15	72	17

Drill as in Exercise CXVI.

CCLXXVI.

How many bones are there in the head, there being 8 of the skull, 14 of the face, 8 of the ear, 32 of the teeth? How many of the trunk, there being 24 of the ribs, 24 of the spine, 1 of the breast, 1 of the neck, 2 of the hips, 2 named the sacrum and the coccyx? How many in each upper extremity? how many in both,—there being two of the shoulder blade and collar bone, 1 of the upper arm, 2 of the fore-arm, 8 of the wrist, 5 of the palm, and 14 of the fingers,

in each? How many in each, lower extremity? how many in both, — there being 1 of the thigh, 2 of the leg, 1 of the knee, 7 of the ankle, 5 of the foot, 14 of the toes, in each? How many in the whole body?

A merchant sold several cases of cloth, containing, severally, 197 yards, 215 yards, 309 yards, 269 yards : how many yards did he sell in all?

It was 116 years from the discovery of America, by Columbus (in 1492), to the settlement of Jamestown, in Virginia (in 1608); 168 years from the latter event to the Declaration of the Independence of the British Colonies (in 1776); 93 years from the latter event to the beginning of the presidency of Ulysses S. Grant (in 1869): how long from the discovery of America to the beginning of Grant's presidency?

Reproduce.

CCLXXVII.

Count by sevens, 1 to 106, 2 to 107, 3 to 101, 4 to 102, 5 to 103, 6 to 104, 7 to 105, and backward.

Find the difference between the numbers severally named below, and properly arrange, and write them, with the results.

999 — 777	966 — 777	843 — 147
904 — 635	842 — 611	811 — 642
817 — 62	643 — 219	517 — 86
333 — 199	115 — 76	923 — 609
875 — 186	743 — 239	648 — 257
515 — 237	427 — 158	327 — 97
819 — 328	756 — 39	756 — 309
756 — 239	543 — 154	606 — 338
424 — 139	555 — 67	555 — 156
727 — 348	727 — 325	442 — 157
532 — 249	960 — 88	876 — 182

Drill as in Exercise XCIV.

CCLXXVIII.

The roads from Boston to Cincinnati pass through Albany, Buffalo, Cleveland, and Columbus. The distance from Boston to Albany is 198 miles; from Albany to Buffalo, 297 miles; from Buffalo to Cleveland, 183 miles; from Cleveland to Columbus, 134 miles; from Columbus to Cincinnati, 120 miles. How far is it from Boston to Buffalo? Boston to Cleveland? Boston to Columbus? Boston to Cincinnati? Albany to Cleveland? Albany to Columbus? Albany to Cincinnati? Buffalo to Columbus? Buffalo to Cincinnati? When a traveller from Boston to Cincinnati reaches Buffalo, how much farther has he to go? A traveller from Cincinnati to Boston reaches Cleveland: how much farther has he to go?

Two men set out from the same place in the same direction. One stops at a town 975 miles away, the other 579 miles away: how far are they apart?

A merchant having a stock of particular goods valued at 875 dollars, after a time found that he had sold from it 358 dollars' worth: how much had he remaining?

A drover buys sheep in Ohio, of several farmers, as follows: 76, 129, 83, 27, 114, 237. He sold at Buffalo, 217; at Albany, 139; and the remainder at New York: How many had he when he started from Ohio? how many after the sale at Buffalo? and how many remained for sale in New York?

Reproduce.

CCLXXIX.

Count by eights, 1 to 105, 2 to 106, 3 to 107, 4 to 108, 5 to 101, 6 to 102, 7 to 103, 8 to 104, and backward.

Write the following multiplications in a neat table:

FORM :	$1 \times 2 = 2$
	$1 \times 3 = 3$
	$1 \times 4 = 4$

the multiplicand, the product underneath, separated by a line:
always units under units, &c.

17 × 6	28 × 6	39 × 6	15 × 7
26 × 7	37 × 7	48 × 7	59 × 7
13 × 8	24 × 8	35 × 8	46 × 8
57 × 8	68 × 8	79 × 8	13 × 9
24 × 9	35 × 9	46 × 9	57 × 9
68 × 9	79 × 9	13 × 5	24 × 5
35 × 5	46 × 5	57 × 5	68 × 5
79 × 5	83 × 4	94 × 4	105 × 4
116 × 4	127 × 4	138 × 4	149 × 4
111 × 3	123 × 3	134 × 3	222 × 3
225 × 3	275 × 3	13 × 10	24 × 10
35 × 10	46 × 10	57 × 10	68 × 10
79 × 10	13 × 11	34 × 11	55 × 11
76 × 11	87 × 11	28 × 11	39 × 11
13 × 12	24 × 12	35 × 12	46 × 12
57 × 12	68 × 12	79 × 12	77 × 8
82 × 12	69 × 11	72 × 9	156 × 6

Drill as in Exercise CCXXII.

CCLXXXII.

A cooper sold a miller enough flour-barrels to fill 7 cars, each car containing 136 barrels: how many barrels were there in all?

A man bought 7 building lots at 125 dollars each: what did he pay for the whole?

Certain lots have a front of 68 feet each, and 12 of them extend from one street to the next: what is the length of the line from street to street?

If a man travel 214 miles in a day, how many miles will he travel in 3 days? In 2 days? In 4 days?

The multiplicand is 176, the multiplier 5: what is the product? What if the multiplicand is 127? 138? 199? 154? 125?

$$417, \times 2, - 247, + 47, - 215, + 37, + 2, = ?$$

Sold 217 barrels of apples at 4 dollars a barrel, and received 375 dollars in part payment: how many dollars were still due?

$$325, \times 3, - 384, \div 3, + 573, \div 5, = ?$$

In a peck there are 8 quarts: how many quarts are there in 45 pecks? In 56 pecks? In 68 pecks? In 75 pecks? In 87 pecks? In 93 pecks? In 104 pecks? In 112 pecks? In 124 pecks?

$$436, \times 2, \div 8, \times 6, - 479, \times 4, \div 7, = ?$$

If a locomotive runs 34 miles in 1 hour, how many miles will it go in 8 hours? In 10 hours? In 9 hours? In 12 hours? In 11 hours?

Reproduce.

CCLXXXIII.

Count by elevens, 1 to 111, 2 to 101, 3 to 102, 4 to 103, 5 to 104, 6 to 105, 7 to 106, 8 to 107, 9 to 108, 10 to 109, 11 to 110, and backward.

Write the following divisions:

$$\text{FORM: } 4 \div 2 = 2$$

$$10 \div 5 = 2$$

$$16 \div 4 = 4$$

How many times is 8 contained in 96? in 88? in 80? in 72? in 64? in 56? in 48? in 40? in 32? in 24? in 16? in 8?

9, in 108? in 99? in 90? in 81? in 72? in 63? in 54? in 45? in 36? in 27? in 18? in 9?

10, in 120? in 110? in 100? in 90? in 80? in 70? in 60? in 50? in 40? in 30? in 20? in 10?

11, in 132? in 121? in 110? in 99? in 88? in 77? in 66? in 55? in 44? in 33? in 22? in 11?

12, in 144? in 132? in 120? in 108? in 96? in 84? in 72? in 60? in 48? in 36? in 24? in 12?

Drill as in Exercise CIII.

CCLXXXIV.

Count by twelves, 1 to 109, 2 to 110, 3 to 111, 4 to 112, 5 to 101, 6 to 102, 7 to 103, 8 to 104, 9 to 105, 10 to 106, 11 to 107, 12 to 108, and backward.

Write the following divisions, the dividend above the divisor, with a line drawn between :

FORM: $\frac{4}{3} = 2$, $\frac{10}{8} = 2$, $\frac{16}{4} = 4$

Divide 144 by 12; 132 by 11; 132 by 12; 121 by 11; 120 by 10; 120 by 12; 110 by 10; 110 by 11; 108 by 9; 108 by 12; 100 by 10; 99 by 9; 99 by 11; 96 by 8; 96 by 12; 90 by 9; 90 by 10; 88 by 8; 88 by 11; 84 by 7; 84 by 12; 81 by 9; 80 by 8; 80 by 10; 77 by 7; 77 by 11; 72 by 6; 72 by 8; 72 by 9; 72 by 12; 70 by 7; 70 by 10; 66 by 6; 66 by 11; 64 by 8; 63 by 7; 63 by 9; 60 by 5; 60 by 6; 60 by 10; 60 by 12; 56 by 7; 56 by 8; 54 by 6; 54 by 9; 50 by 5; 50 by 10; 49 by 7; 48 by 4; 48 by 6; 48 by 8; 48 by 12; 45 by 5; 45 by 9; 44 by 4; 44 by 11.

Drill as in Exercise CIII.

CCLXXXV.

Write a complete division table, from $144 \div 12$ to $2 \div 2$.

FORM: $144 \div 12 = ?$ $132 \div 11 = ?$ to $24 \div 2 = 12$
 $132 \div 12 = ?$ $121 \div 11 = ?$ $22 \div 2 = 11$
to to to
 $12 \div 12 = 1$ $11 \div 11 = 1$ $2 \div 2 = 1$

Drill as in Exercise CIII.

CCLXXXVI.

46. When the dividend exceeds 12 times the divisor, and the divisor is 12 or less, for convenience, the latter is written to the left of the dividend, separated by a short line; while the *quotient*, that is, the number of times the divisor is contained in the dividend, is written below, thus :

$$\begin{array}{r} \text{Divisor}) \text{Dividend} \\ \text{Quotient} \end{array} \quad 8 \div 2 = 4, \quad 2) \frac{8}{4}$$

47. Additions, subtractions, and multiplications are begun at the right-hand figure, but division at the left-hand figure.

Suppose we have 999 to divide by 3: $3) 999$. We divide, first, the 9 hundreds, the quotient being 3 hundreds, which we write in the proper place in the quotient: next, the 9 tens divided by 3 give 3 tens, which we write in the tens place; then, the 9 units divided by 3 give 3 units. $999 = 900 + 90 + 9$; divided by 3, it is $\frac{900}{3} + \frac{90}{3} + \frac{9}{3} = 300 + 30 + 3 = 333$. That is the work we did in our division.

Write the following divisions, the divisor to the left of the quotient underneath the dividend, the terms separated by lines : —

$999 \div 9$	$909 \div 9$	$888 \div 8$	$808 \div 8$
$777 \div 7$	$707 \div 7$	$666 \div 6$	$606 \div 6$
$555 \div 5$	$505 \div 5$	$888 \div 4$	$884 \div 4$
$848 \div 4$	$844 \div 4$	$488 \div 4$	$484 \div 4$
$448 \div 4$	$444 \div 4$	$999 \div 3$	$996 \div 3$
$993 \div 3$	$969 \div 3$	$966 \div 3$	$963 \div 3$
$939 \div 3$	$936 \div 3$	$933 \div 3$	$699 \div 3$
$696 \div 3$	$369 \div 3$	$639 \div 3$	$396 \div 3$
$693 \div 3$	$366 \div 3$	$636 \div 3$	$666 \div 3$
$399 \div 3$	$663 \div 3$	$669 \div 3$	$333 \div 3$
$309 \div 3$	$606 \div 3$	$903 \div 3$	$888 \div 2$
$688 \div 2$	$488 \div 2$	$288 \div 2$	$844 \div 2$
$644 \div 2$	$444 \div 2$	$822 \div 2$	$622 \div 2$

$422 \div 2$	$222 \div 2$	$868 \div 2$	$668 \div 2$
$468 \div 2$	$268 \div 2$	$848 \div 2$	$648 \div 2$
$448 \div 2$	$248 \div 2$	$828 \div 2$	$628 \div 2$
$428 \div 2$	$228 \div 2$	$244 \div 2$	$336 \div 3$

DRILL: 222 ; 9 is contained in 9 hundreds, 1 hundred times. I write 1 in the quotient in the hundreds place. 9 in 9 tens, 1 ten times: I write 1 in the tens place. 9 in 9 units, 1 time: I write 1 in the units place. And so on.

CCLXXXVII.

48. When the first figure at the left does not contain the divisor, change it to its value in the next lower denomination, and add it to the next figure at the right.

Thus: 273 is to be divided by 3. $3 \overline{) 273}$. The 2 in the hundreds place does not contain the divisor; but 2 hundreds are 20 tens. These added to 7 tens make 27 tens. 3 is contained in 27 tens, 9 tens times. The 9 is to be written in the tens place. Then proceed to the division of the units.

Write the following divisions, as in Exercise CCLXXXVI.

$819 \div 9$	$729 \div 9$	$639 \div 9$	$549 \div 9$
$459 \div 9$	$369 \div 9$	$279 \div 9$	$189 \div 9$
$728 \div 8$	$648 \div 8$	$568 \div 8$	$488 \div 8$
$408 \div 8$	$328 \div 8$	$248 \div 8$	$168 \div 8$
$637 \div 7$	$567 \div 7$	$497 \div 7$	$427 \div 7$
$857 \div 7$	$287 \div 7$	$217 \div 7$	$147 \div 7$
$546 \div 6$	$486 \div 6$	$426 \div 6$	$366 \div 6$
$306 \div 6$	$246 \div 6$	$186 \div 6$	$126 \div 6$
$455 \div 5$	$405 \div 5$	$355 \div 5$	$305 \div 5$
$255 \div 5$	$205 \div 5$	$155 \div 5$	$105 \div 5$
$368 \div 4$	$364 \div 4$	$360 \div 4$	$328 \div 4$
$324 \div 4$	$320 \div 4$	$288 \div 4$	$284 \div 4$
$280 \div 4$	$248 \div 4$	$244 \div 4$	$240 \div 4$
$208 \div 4$	$204 \div 4$	$200 \div 4$	$168 \div 4$
$164 \div 4$	$160 \div 4$	$129 \div 3$	$126 \div 3$
$123 \div 3$	$120 \div 3$	$120 \div 4$	$246 \div 3$

Drill as in Exercise CCLXXXVI.

CCLXXXVIII.

49. When the division of a figure not in the units place leaves a remainder, the remainder is to be changed to its value in the next lower denomination, and added to the next figure at the right.

Suppose 552 to be divided by 2, 2)552. I divide the 5 in the hundreds place, and find the quotient is less than 3, and more than 2. $2 \times 2 = 4$: 5 therefore contains 2, 2 times, and 1 remains. I write the 2 in the hundreds place. The 1 remaining is 1 hundred, undivided. Its value in tens is 10. 10 tens \div 5 tens = 15 tens. 2 in 15, 7 times, and 1 remains undivided: so I write 7 in the tens place. Then I take the value in units of the 1 ten remaining undivided, which is 10. 10 units \div 2 units = 12 units, which contains 2, 6 times. I write 6 in the units place. $552 = 400 + 140 + 12$. $400 \div 2 + 140 \div 2 + 12 \div 2 = 200 + 70 + 6 = 276 =$ the full quotient.

Write as in Exercise CCLXXXVI.

732 \div 2	732 \div 3	732 \div 4	732 \div 6
738 \div 9	736 \div 8	344 \div 2	345 \div 3
375 \div 5	755 \div 5	648 \div 4	417 \div 3
568 \div 4	326 \div 2	459 \div 3	450 \div 2
726 \div 6	316 \div 2	334 \div 2	348 \div 2
356 \div 2	847 \div 7	655 \div 5	625 \div 5
366 \div 2	328 \div 2	338 \div 2	356 \div 2
345 \div 3	375 \div 3	456 \div 4	456 \div 3
456 \div 2	456 \div 6	455 \div 7	570 \div 2
570 \div 3	570 \div 5	570 \div 6	873 \div 3
873 \div 9	875 \div 7	875 \div 5	648 \div 2
648 \div 3	648 \div 4	648 \div 6	648 \div 8
648 \div 9	648 \div 12	726 \div 2	726 \div 3
726 \div 6	936 \div 2	936 \div 4	936 \div 3
936 \div 6	936 \div 8	936 \div 9	936 \div 12
172 \div 2	174 \div 3	261 \div 3	261 \div 9
384 \div 3	434 \div 7	592 \div 4	592 \div 8

Drill as in Exercise CCLXXXVI.

CCLXXXIX.

50. When the division of a figure in the units place leaves a remainder, that remainder is a part of the dividend not divided, and may be written at the end of the quotient, with the divisor beneath it, and a line between.

Thus: we have 243 to divide by 2. $2 \overline{) 243}$. We divide the hundreds, and find the quotient 1, which we write in its proper place. We find the quotient of the tens 2, which we accordingly write down. The quotient of the units is 1, but $1 \times 2 = 2$, and 1 unit of the dividend remains undivided. The full quotient is, therefore, $121\frac{1}{2}$, which may for the present be read *One hundred and twenty-one, and one divided by two*. Or, dividing 337 by 3: the quotient is $112\frac{1}{3} = \text{One hundred and twelve, and one divided by three}$.

Write as in Exercise CCLXXXVI.

$133 \div 2$	$133 \div 3$	$133 \div 4$	$335 \div 2$
$335 \div 3$	$335 \div 4$	$577 \div 2$	$577 \div 3$
$577 \div 4$	$577 \div 5$	$577 \div 6$	$577 \div 7$
$577 \div 8$	$577 \div 9$	$577 \div 10$	$577 \div 11$
$577 \div 12$	$779 \div 2$	$779 \div 3$	$779 \div 4$
$779 \div 5$	$779 \div 6$	$779 \div 7$	$779 \div 8$
$779 \div 9$	$779 \div 10$	$779 \div 11$	$779 \div 12$
$960 \div 2$	$960 \div 3$	$960 \div 4$	$960 \div 5$
$960 \div 6$	$960 \div 7$	$960 \div 8$	$960 \div 9$
$960 \div 10$	$960 \div 11$	$960 \div 12$	$400 \div 2$
$400 \div 3$	$400 \div 4$	$400 \div 5$	$400 \div 6$
$400 \div 7$	$400 \div 8$	$400 \div 9$	$400 \div 10$
$400 \div 11$	$400 \div 12$	$555 \div 2$	$555 \div 3$
$555 \div 4$	$555 \div 5$	$555 \div 6$	$555 \div 7$
$555 \div 8$	$555 \div 9$	$555 \div 10$	$555 \div 11$
$555 \div 12$	$560 \div 2$	$560 \div 3$	$560 \div 4$
$560 \div 5$	$560 \div 6$	$560 \div 7$	$560 \div 8$
$560 \div 9$	$560 \div 10$	$560 \div 11$	$560 \div 12$
$644 \div 2$	$644 \div 4$	$644 \div 5$	$644 \div 7$

Drill as in Exercise CCLXXXVI.

CCXC.

The distance from Boston to Albany, by the railroad, is 198 miles : at how many miles per hour must the locomotive run, to make the distance in 9 hours ? In 6 hours ?

If one man can do a piece of work in 432 days, how long would it take 2 men to do it ? 3 men ? 4 men ? 6 men ? 8 men ? 9 men ? 12 men ?

How many dozens are there in 432 ? In 564 ? In 672 ? In 744 ? In 876 ? In 996 ?

If 5 acres of land cost 975 dollars, how many dollars is that for each acre ?

How many weeks are there in a year of 365 days ?

There are 11 half-yards in a rod : how many rods in 121 half-yards ? In 275 half-yards ? In 341 half-yards ? In 473 half-yards ? In 594 half-yards ? In 616 half-yards ? In 715 half-yards ? In 814 half-yards ? In 957 half-yards ? In 979 half-yards ?

9 times a certain number is 108 : what is the number ? What if it were 288 ? 360 ? 477 ? 531 ? 648 ? 729 ? 819 ? 981 ?

A man having 972 dollars, divides it into 12 shares, giving 4 shares to his wife, 3 to his eldest son, 2 to his eldest daughter, and 1 each to his 3 other children : how many dollars did each receive ?

Reproduce.

CCXCI.

51. When the divisor exceeds 12, it is convenient to write the quotient at the right of the dividend, and to set forth at length the work which in previous examples has been done in the mind.

Divisor) Dividend (Quotient.

We are to divide 273 by 13. 13) 273 (13 is not contained in the hundreds figure; we therefore reckon the 2 hundreds as 20 tens, which added to the 7 tens in the dividend make 27 tens. 13 is contained in 27 not less than 2 times; so we write the 2 in the quotient, remembering that it is tens. 13) 273 (2—. Multiplying the 13 by the 2 tens, we have for a product 26 = 26 tens, or 2 hundreds and 6 tens, which we write under the dividend in the proper place, that by subtraction we may ascertain how much of the dividend is yet undivided.

$$13) 273 (21$$

$$\underline{26}$$

$$13$$

$$\underline{13}$$

1 ten remains and 3 units. We add the 3 units to the 1 ten = 10 units, and the sum is 13 units. The divisor is contained in 13 units 1 time, and there is no remainder. We write the 1 in the units place of the quotient, and find the full quotient to be 21. The 26 found in the work is read *Two hundred and sixty*. Why? How much of the dividend remains undivided after the "26" is subtracted?

Here is the work of several divisions, which the pupil may explain :

$$13) 975(75$$

$$\underline{91}$$

$$65$$

$$\underline{65}$$

$$25) 999(39\frac{4}{5}$$

$$\underline{75}$$

$$249$$

$$\underline{225}$$

$$24$$

$$17) 879(51\frac{4}{17}$$

$$\underline{85}$$

$$29$$

$$\underline{17}$$

$$12$$

$$19) 999(52\frac{11}{19}$$

$$\underline{95}$$

$$49$$

$$\underline{38}$$

$$11$$

Write the following divisions, according to the above form :

$$540 \div 13$$

$$540 \div 14$$

$$540 \div 15$$

$$540 \div 16$$

$$720 \div 15$$

$$720 \div 16$$

$$720 \div 17$$

$$720 \div 18$$

$$720 \div 19$$

$$720 \div 20$$

$$975 \div 16$$

$$975 \div 17$$

$$849 \div 21$$

$$849 \div 23$$

$$849 \div 24$$

$$849 \div 25$$

$$762 \div 24$$

$$762 \div 27$$

$$762 \div 14$$

$$762 \div 19$$

$975 \div 18$	$975 \div 19$	$975 \div 20$	$975 \div 21$
$975 \div 22$	$975 \div 23$	$975 \div 24$	$975 \div 25$
$333 \div 13$	$333 \div 14$	$333 \div 15$	$333 \div 16$
$333 \div 17$	$333 \div 18$	$333 \div 19$	$333 \div 20$
$308 \div 14$	$308 \div 28$	$308 \div 15$	$308 \div 16$
$432 \div 16$	$432 \div 17$	$432 \div 18$	$432 \div 19$
$432 \div 20$	$432 \div 21$	$432 \div 22$	$432 \div 23$
$432 \div 24$	$573 \div 25$	$573 \div 26$	$573 \div 27$

Drill as in Exercise CCLXXXVI.

CHAPTER THE TWELFTH.

Numbers of Two Periods.

CCXCII.

What is the largest number you can express in the units place? What in the second place? What in the two places? What in the third? What in the third and second? What in the third and first? What in the three?

52. $999 + 1 = 900 + (99 + 1) = 900 + 100 = 9$ hundreds $+ 1$ hundred $= 10$ hundreds. But 10 hundreds we cannot write in the hundreds place, and therefore we remove our figures farther to the left. We again begin our series, for 10 hundreds writing 1 in the fourth place, thus, 1,000.

Here we call the 1, *One Thousand*. This is composed of 100×10 , or 10 hundreds; 10×100 , 100 tens; or $1 \times 1,000$, 1,000 units. 20 hundreds we express by writing 2 in the fourth place, where it becomes 2 thousands: so we proceed until we have again employed all our figures.

Write numbers in lines and columns, as follows, filling vacant places with ciphers.

3 in the fourth place, 3 in the third, 3 in the second, 3 in the first;

5 in the fourth, 5 in the first;

4 in the third, 4 in the first;
 2 in the fourth, 2 in the second;
 7 in the fourth, 3 in the second, 3 in the first;
 8 in the fourth, 5 in the third, 5 in the first;
 9 in the fourth;
 1 in the fourth, 6 in the third, 7 in the second;
 4 in the fourth, 6 in the first;
 8 in the fourth, 9 in the second;
 2 in the fourth, 1 in the second, 1 in the first;
 2 in the fourth, 7 in the third;
 4 in the fourth, 5 in the third, 5 in the second;
 2 in the fourth, 7 in the third, 7 in the first;
 1 in the fourth, 8 in the third, 6 in the second, 9 in the first.

Analyze and read as in Exercise CCLXVI.

CCXCIII.

For what does 5 stand in the first, or right-hand place? in the fourth? in the second? in the third?

0, in the 3d? in the 2d? in the 1st? in the 4th?

7, in the 4th? in the 1st? in the 2d? in the 3d?

9, in the 2d? in the 4th? in the 3d? in the 1st?

2, in the 1st? in the 2d? in the 3d? in the 4th?

8, in the 4th? in the 3d? in the 2d? in the 1st?

6, in the 2d? in the 4th? in the 1st? in the 3d?

1, in the 4th? in the 1st? in the 2d? in the 3d?

3, in the 1st? in the 3d? in the 4th? in the 2d?

4, in the 3d? in the 4th? in the 1st? in the 2d?

53. In any written number, each association of three figures in their regular order of place, beginning at the right hand, is called a period. Thus, units, tens, and hundreds become the first, or units period. The fourth place belongs to a new period — the second or thousands period. Each

period is named from its lowest place. For convenience of writing and reading numbers, the periods may be separated by a comma. Thus, 1,869; 1,234; 1,001; 2,000; 9,090.

Separate the following numbers into periods, analyze them as to places and periods, and read them:

5674	2372	846	9259	1467
2917	849	3218	4691	1363
175	2924	8732	3656	4589
2197	6278	7451	8643	9775
646	572	5843	678	6852

Write the numbers suggested in the early part of this lesson, filling vacant places with ciphers; separate them into periods, analyze and read them: thus, 5; 5,000; 50; 500, &c., &c.

CCXCIV.

Analyze and read the following numbers:

2,174	3,000	4,006	7,018	4,238
575	1,460	9,817	6,002	8,000
8,001	8,010	8,200	1,492	2,046
5,113	5,025	1,001	1,010	4,017
3,090	6,047	46	1,046	4,600
1,460	5,601	2,111	2,907	2,097
2,970	5,050	6,167	6,067	6,060
6,007	8,888	8,008	2,345	6,789

CCXCV.

54. When thousands or greater numbers are given, write the figures belonging to the left-hand period first, putting the comma in its place before proceeding to write the next period. Do not attempt to write the whole number before

using the comma. Fill all the places of each period, except that at the left hand when not needful: if no figures are required, fill out with ciphers.

Thus, we are to write One thousand and one—that is, 1 thousand and 1 unit, no tens or hundreds being given. We first write the thousand, thus: 1,—,—, and then proceed to the units period. We have no hundreds, so we use a cipher, 1,0 — —; no tens, so we use another, 1,00 —; we then write the unit, 1,001.

No pupil should be allowed to write in an irregular order. In *notation*, no *numeration* should be permitted. Call 1,200, not Twelve hundred, but One thousand two hundred, &c., &c. It is well, in dictating this exercise, to require the class to act in concert at the word of command. The method of writing we suggest will prove invaluable. Let the right habit be now formed, and it will save great difficulty farther on. The teacher may here dictate, we will say, *One thousand, two hundred and thirty-four*. The class waits for command. *Teacher*: Write the thousands. — Write the separating comma. — Write the hundreds. — Write the tens. — Write the units. — What have you written? Again; *Two thousand and twenty*. The class waits. Teacher directs as before. Experiment from time to time will determine when this method may be discontinued. Continue as long as needful.

Write the following numbers, separating them into periods, if filling more than three places:

Two thousand, four hundred and sixty-five; Six thousand, two hundred and ninety-seven; Four thousand, five hundred and twenty-one; Three thousand, two hundred and seventeen; Nine thousand, nine hundred and ninety-nine; One thousand, seven hundred and eleven; One thousand and one; Five thousand and five; Seven thousand and seven; Eight thousand and eighty; Three thousand, four hundred; Seven thousand and fifty-five; One thousand and eleven; Nine thousand and ninety; Six thousand, six hundred.

Six hundred and six; Six thousand and six; Seven hundred; Seven thousand and seventy; Seven thousand and seven; Seven thousand seven hundred; One hundred and one; One thousand and ten; One thousand one hundred; One thousand and eleven; One thousand one hundred and eleven; Nine hundred and nine; Nine hundred and ninety;

Nine thousand nine hundred; Nine thousand and nine; Two hundred and two; Two thousand and two; Two hundred and twenty; Two thousand and twenty; Two thousand two hundred; Eight hundred and eight; Eight thousand and eight; Eight hundred and eighty; Eight thousand and eighty; Eight thousand eight hundred; Six hundred and sixty; Six thousand and sixty; Six thousand six hundred; Three hundred and three; Three thousand and three; Three hundred and thirty; Three thousand and thirty; Three thousand three hundred; One thousand, eight hundred and sixty-nine; Seven thousand five hundred and nineteen; Eight thousand four hundred and sixty-seven.

Drill as in Exercise CCLXVI.

CCXCVI.

55. The letter M is used to represent 1,000, and must be repeated as many times as there are thousands to express. Or the number of thousands may be expressed by using the letters for that number, and drawing a line over them.

Thus: \overline{V} represents 5,000; \overline{IX} , 9,000; \overline{VIII} , 8,000. Write first the letters expressing thousands, then those for the hundreds, and so on.

Read the following:

C; D; M; MI; MV; MX; ML; MC; MD; \overline{MIX} ; $\overline{MMCCXXII}$; $\overline{MCCCCXCII}$; MDLV; \overline{IVXVII} ; \overline{VIVI} ; $\overline{MDCCLXXXIX}$; $\overline{VIIIDCCCCLXXXVIII}$.

Write in letters the following numbers;

500	555	1,000	1,776
1,869	2,554	8,640	9,575
4,719	3,333	5,040	8,988

CCXCVII.

What is the greatest number we can express in the fourth place? in the fourth and first? in the fourth and second? in

the fourth, second, and first? in the fourth and third? in the fourth, third, and second? in the fourth, third, and first? in all four?

56. $9,999 + 1 = 9,000 + (999 + 1) = 9,000 + 1,000 = 9 \text{ thousands} + 1 \text{ thousand} = 10 \text{ thousands}$. To express 10 thousands, we write 1 in the fifth place, 10,000, and read it *Ten thousand*. In analyzing, we call the fifth place the ten-thousands place.

2 in the fifth place becomes 2 ten-thousands, or 20 thousands, and we read it *Twenty thousand*. What does 3 in the fifth place become? How to be read? 4? 5? 6? 7? 8? 9?

What is the greatest number we can express in the 5th place? in the 5th and first? in the 5th and 2d? in the 5th, 2d, and 1st? in the 5th and 3d? in the 5th, 3d, and 2d? in the 5th, 3d, and 1st? in the 5th, 3d, 2d, and 1st? in the 5th and 4th? in the 5th, 4th, and 3d? in the 5th, 4th, and 2d? in the 5th, 4th, and 1st? in the 5th, 4th, 3d, and 2d? in the 5th, 4th, 3d, and 1st? in all five?

57. $99,999 + 1 = 90,000 + (9,999 + 1) = 90,000 + 10,000 = 9 \text{ ten-thousands} + 1 \text{ ten-thousand} = 10 \text{ ten-thousands}$. To express 10 ten-thousands, we write 1 in the sixth place, 100,000, and read it *One hundred thousand*. In analyzing we call the sixth place the hundred-thousands place.

2 in the sixth place becomes 2 hundred-thousands, or 200 thousands, and we read it *Two hundred thousand*. What does 3 in the sixth place become? 4? 5? 6? 7? 8? 9? How read?

CCXCVIII.

58. We read the units period without saying units: thus, 327, *Three hundred and twenty-seven*. We read the other periods as we would the units, only calling the name of the period. 327, if it occurred in the thousands period, we would read *Three hundred and twenty-seven thousand*.

Write numbers in lines and columns, as follows, dividing into periods, and filling vacant places with ciphers:

1 in the 4th place; in the 5th; in the 6th; in the 3d; in the 6th and 1st; in the 6th and 2d; in the 6th, 4th, and 2d; in the 6th, 5th, and 1st; in the 6th, 5th, and 2d; in the 6th and 3d.

2, in the 1st place; in the 4th; in the 2d; in the 5th; in the 3d; in the 6th; in the 6th and 1st; in the 5th and 2d; in the 4th and 3d; in the 6th, 5th, and 3d; in the 6th, 4th, and 2d; in the 6th, 4th, and 1st.

7, in the 6th place; in the 5th; in the 4th; in the 3d; in the 2d; in the 1st; in the 6th and 1st; in the 6th and 5th; in the 6th and 4th; in the 6th and 3d; in the 6th and 2d; in the 6th, 5th, and 2d; in the 6th, 5th, and 1st; in the 6th, 4th and 1st; in the 6th, 4th, and 2d.

4 in the 5th, 2 in the 3d, 7 in the 1st.

3 in the 6th, 5 in the 4th, and 7 in the second.

1 in the 6th, 3 in the 5th, 9 in the 4th, 3 in the 3d, 1 in the 2d, 1 in the 1st.

Analyze and read as in Exercise CCLXVI.

CCXCIX.

Analyze and read the following numbers:

444,444	404,444	400,444	400,044
400,004	400,000	213,469	203,069
200,060	200,009	15,236	15,030
27,016	11,011	222,017	202,022
467,016	167,476	25,025	255,473
255,470	255,403	255,073	250,473
205,473	17,070	407,209	600,060

Also read thus: $444,444 = 400,000 + 40,000 + 4,000 + 400 + 40 + 4$; or, $11,011 = 10,000 + 1,000 + 10 + 1$; and so on. The cipher is always to be treated as nothing, and ought never to be mentioned in analysis or numeration.

CCC.

Let the following exercise be wrought in concert: The teacher dictates the number to be written; then directs: "Write the hundred-thousands."—"Write the ten-thousands."—"Write the thousands."—"Write the separating comma."—"Write the hundreds."—"Write the tens."—"Write the units." Instruct the pupil that ciphers to the left of the given number are useless.

Write the following numbers, separating them into periods, and filling places with ciphers:

One hundred and sixteen thousand, four hundred and sixty-five; Forty-five thousand and forty-five; Three hundred and four thousand, three hundred and four; Six hundred and forty thousand, six hundred and forty; One hundred thousand one hundred; One hundred thousand and one; One hundred thousand and ten; Two hundred and thirty-seven thousand and sixty-eight; Five hundred and twenty-five thousand, six hundred and forty-six; Seventy thousand and seventy; Seven hundred and seventeen thousand and seventeen; Sixteen thousand, six hundred and sixteen; Six hundred and fourteen thousand, four hundred and twenty-seven; Eleven thousand and eleven; One hundred and seven thousand, two hundred and nine; Two thousand and seven; Twenty thousand and seven; Two hundred thousand and seven.

Drill as in Exercise CCLXVI.

CCCI.

Add the following columns, writing the amount below:

147,468	132,227	109,217
213,946	123,132	178,166
197,405	224,418	226,225
227,611	118,121	117,306
19,447	143,213	210,102
<u>2,099</u>	<u>127,203</u>	<u>147,214</u>

246,475	103,137	122,308
123,456	128,215	207,124
134,567	215,121	168,107
189,056	126,119	127,346
114,219	145,309	209,259
<u>117,027</u>	<u>203,218</u>	<u>119,238</u>

287,346	524,577	12,027
386,227	58,829	84
97,518	147,077	5,568
<u>184,889</u>	<u>218,808</u>	<u>879,869</u>

3	17	416	1,237	42,317
7	27	233	4,568	15,448
6	16	107	3,714	23,046
9	43	439	6,432	44,278
4	29	296	2,964	36,114
2	40	417	4,017	28,237
8	87	877	8,877	14,456
5	96	196	1,963	23,075
7	43	403	4,516	35,486
2	25	255	1,869	42,117
6	16	168	6,473	33,846
9	99	437	8,217	40,758
8	83	283	5,164	33,614
4	14	714	3,279	47,432
3	33	336	4,364	39,146
6	65	605	2,477	28,477
8	58	518	4,556	19,941
5	85	859	7,429	15,673
7	73	737	3,364	27,049
<u>7</u>	<u>39</u>	<u>394</u>	<u>2,478</u>	<u>13,698</u>

Drill as in Exercise CXVI.

CCCH.

Properly arrange the following subtractions and write the results :

1,056 — 432	.1,056 — 479
10,250 — 1,342	15,675 — 6,589
147,382 — 75,490	365,427 — 182,758
906,609 — 347,521	457,366 — 123,477
10,432 — 8,564	234,567 — 89,677
345,678 — 196,789	914,472 — 253,534
904,635 — 843,147	842,611 — 643,219
648,257 — 427,158	32,797 — 8,328
756,039 — 543,154	833,606 — 424,139
96,088 — 87,618	764,174 — 643,454
437,249 — 184,375	757,263 — 572,280
722,225 — 222,099	429,037 — 293,177
931,310 — 313,104	131,067 — 31,476
476,185 — 273,761	612,173 — 12,509

Drill as in Exercise XCII.

CCCHH.

Write the following multiplications, the multiplier under the multiplicand, the product underneath, separated by a line : always units under units, &c.

144 × 5	144 × 8	144 × 9	144 × 12
378 × 7	378 × 9	378 × 8	378 × 11
378 × 12	516 × 8	516 × 9	516 × 10
516 × 11	516 × 12		

Multiply 13,078 by 3; by 4; by 5; by 6; by 7; by 8; by 9; by 10; by 11; by 12.

Multiply 57,416 by 2; by 3; by 4; by 5; by 6; by 7; by 8; by 9; by 10; by 11; by 12.

Multiply 69,382 by 2; by 3; by 4; by 5; by 6; by 7; by 8; by 9; by 10; by 11; by 12.

Drill as in Exercise CCXXII.

CCCIV.

59. When 1 stands in the place of units, it represents simply *One*; when in the second place, *Ten*, or 1×10 ; when in the third place, *One hundred*, or 10×10 ; when in the fourth place, *One thousand*, or 100×10 . So on each remove of one place to the left, its value is multiplied by 10. To multiply any number by 10, therefore, remove the figures one place to the left, filling vacant places with ciphers.

Thus: 6×10 : the 6 is removed to the tens place, the units place taking a cipher. By the removal, the 6 became 6 tens, or sixty: 60. 125×10 ; removed, the multiplicand becomes 1,25—; fill the units place with a cipher, and we have 1,250. $16,248 \times 10$; removed, we have 162,48—; use the cipher, and we have 162,480.

In these exercises, let a scholar not put a cipher into the product, until the vacancy is ascertained.

Write the following multiplications, the multiplier under the multiplicand, the product underneath, separated by a line: always units under units, &c.

5×10 ; 17×10 ; 234×10 ; $4,327 \times 10$; $15,040 \times 10$;
 7×10 ; 36×10 ; 400×10 ; $6,000 \times 10$; $70,000 \times 10$.

Write the product underneath the multiplicand, without stating the multiplier:

4×10 ; 57×10 ; 507×10 ; $5,007 \times 10$; $50,607 \times 10$;
 9×10 ; 97×10 ; 904×10 ; $9,303 \times 10$; $90,005 \times 10$.

60. $1 \times 100 = 100$; $10 \times 100 = 1,000$. 1, multiplied by 100, is removed from the first to the third place. 1 in the second place, multiplied by 100, is removed to the fourth place. To multiply any number by 100, therefore, remove it two places to the left. $6 \times 100 = 600$; $126 \times 100 = 12,600$; $4,506 \times 100 = 450,600$.

Write the product underneath the multiplicand, without stating the multiplier:

4×100 ; 57×100 ; 507×100 ; $5,007 \times 100$; 8×100 ;
 84×100 ; 875×100 ; $8,046 \times 100$; 5×100 ; $1,234 \times 100$.

CCCV.

61. $1 \times 1,000 = 1,000$; $10 \times 1,000 = 10,000$. 1, multiplied by 1000, is removed from the first to the fourth place: 1, in the second place, multiplied by 1,000, is removed to the fifth place. To multiply any number by 1,000, therefore, remove it three places to the left.

62. To multiply any number by 10,000, remove it four places to the left.

63. To multiply any number by 100,000, remove it five places to the left.

Removing a number to the left five places multiplies it by 100,000; four places, 10,000; three places, 1,000; two places, 100; one place, 10.

How shall we multiply by 10? by 100? by 1,000? by 10,000? by 100,000? When we remove a number three places to the left, how have we modified it? one place? four places? two places? five places? three places?

If you multiply 6 in the first place by 10, where will you put it? if by 1,000? if by 100,000? if by 100? if by 10,000?

If you multiply 5 in the second place by 10, where will you put it? if by 1,000? if by 100? if by 10,000?

If you multiply 4 in the third place by 10, where will you put it? if by 1,000? if by 100?

If you multiply 3 in the fourth place by 10, where will you put it? if by 100?

If you multiply 2 in the fifth place by 10, where will you put it?

CCCVI.

Write the following multiplications, the multiplier under the multiplicand, the product underneath, separated by a line:

$4 \times 1,000$; 4×10 ; $4 \times 10,000$; $4 \times 100,000$; 4×100 ; 30×1 ; 30×100 ; 30×10 ; $30 \times 10,000$;

$30 \times 1,000$; 24×10 ; $24 \times 10,000$; $24 \times 1,000$; 24×100 ; 125×10 ; $125 \times 1,000$; 125×100 ; $1,256 \times 100$; $1,256 \times 10$; 14×100 ; $14 \times 10,000$; 14×10 ; $14 \times 1,000$; $23,706 \times 10$; $1,050 \times 100$; $1,050 \times 10$; 520×100 ; 520×10 ; $520 \times 1,000$.

Drill as in Exercise CCXXII.

CCCVII.

64. $1 \times 1 = 1$. Units multiplied by units give units. $1 \times 10 = 10$: Units multiplied by tens give tens. $1 \times 100 = 100$: Units multiplied by hundreds give what? $1 \times 1,000 = 1,000$: Units multiplied by thousands give what? $10 \times 1 = 10$: Tens multiplied by units give what? Tens multiplied by tens give what? Tens multiplied by hundreds give what? Tens multiplied by thousands give what? Hundreds multiplied by units give what? Hundreds multiplied by tens give what? Hundreds multiplied by hundreds give what?

65. In multiplication, when a multiplier exceeds 12, it is usual to work with its figures in succession, multiplying, first, by the units figure, next by the tens, and then by figures to the left, if any, successively. These partial products, added together, make the total product.

Thus: 144×13 . $13 = 10 + 3$. The product of 3 + the product of 10 = the product of 13. We multiply the 4 units by 3, and produce 12. The 2 is units, the 1 tens. We write the 2 in its proper place. $4 \text{ tens} \times 3 = 12 \text{ tens}$, and 1 ten from the product of the units, make 13 tens. We write the 3 in the tens place, the 1 being 1 hundred. $1 \text{ hundred} \times 3 = 3 \text{ hundreds}$, and 1 hundred from the product of tens make 4 hundreds, which we write in the proper place. The product of 3, then, is 432. We now multiply by 10. We remove the 4 units to the tens place, which makes it 40, and write it underneath the product of 3; the 4 tens to the hundreds place, and the 1 hundred to the thousands place: the product of 10 being 1,440. Adding the two partial products, we find the total product 1,872.

Here are several multiplications, which the pupil will analyze and explain. The pupil will also read the partial products.

175	234	3,246	12,017	24,238
<u>15</u>	<u>18</u>	<u>17</u>	<u>14</u>	<u>16</u>
875	1,872	22,722	48,068	145,428
<u>1,75</u>	<u>2,34</u>	<u>32,46</u>	<u>120,17</u>	<u>242,38</u>
2,625	4,212	55,182	168,238	387,808

Write the following multiplications, with products, according to the above form:

Multiply 276 by 13; by 14; by 15; by 16; by 17; by 18; by 19.

2,348 by 13; by 14; by 15; by 16; by 17; by 18; by 19.

37,409 by 13; by 14; by 15; by 16; by 17; by 18; by 19.

45,515 by 13; by 14; by 15; by 16; by 17; by 18; by 19.

Drill as in Exercise CCXXII.

CCCVIII.

Write as in Exercise CCCVII.

Multiply 437 by 101; by 102; by 103; by 104; by 105; by 106; by 107; by 108; by 109; by 110; by 111; by 112; by 113; by 114; by 115; by 116; by 117; by 118; by 119.

2,567, by 101; by 102; by 103; by 104; by 105; by 106; by 107; by 108; by 109; by 110; by 111; by 112; by 113; by 114; by 115; by 116; by 117; by 118; by 119.

8,291 by 101; by 102; by 103; by 104; by 105; by 106; by 107; by 108; by 109; by 110; by 111; by 112; by 113; by 114; by 115; by 116; by 117; by 118; by 119.

Drill as in Exercise CCXXII.

CCCIX.

66. To multiply by any number of tens, remove the product of that number one place to the left. The product of any number of hundreds, two places to the left, and so on.

Thus: we would multiply 456 by 40. $40 = 10 \times 4$. 6 units $\times 4 = 24$ units; but 6 units $\times 4$ tens = 24 tens. 24 tens are 2 hundreds and 4 tens. We write the 4 in the tens place, thus removing the product one place to the left, and expect to add the 2 hundreds to the product of tens \times tens. 5 tens $\times 4 = 20$ tens; but 5 tens $\times 4$ tens = 20 hundreds. We add the 2 hundreds from the former product, and have 22 hundreds = 2 thousands + 2 hundreds. We write the 2 hundreds in the proper place, and expect to add the 2 thousands to the product of hundreds \times tens. 4 hundreds $\times 4 = 16$ hundreds; but 4 hundreds $\times 4$ tens = 16 thousands. We add 2 thousands from the former product, and have 18 thousands. We write the separating comma, put the 8 in the thousands place, and the 1 in the ⁴⁵⁶ten-thousands place. ₄₀ The units place being vacant, use a cipher. 18,240 The total product is, therefore, 18,240. Let the cipher be put into the units place, only when the vacancy is ascertained.

The pupil will explain the following:

176	236	1,768	4,259	999	575
40	90	50	60	70	80
<u>7,040</u>	<u>21,240</u>	<u>88,400</u>	<u>255,540</u>	<u>69,930</u>	<u>46,000</u>

Write the following, according to the above form, always units under units, &c.:

Multiply 157 by 20; by 200; by 30; by 300; by 40; by 400; by 50; by 500; by 60; by 600; by 70; by 700; by 80; by 800; by 90; by 900.

2,034, by 20; by 200; by 30; by 300; by 40; by 400; by 50; by 60; by 70; by 80; by 90.

716 by 30; by 200; by 40; by 500; by 60; by 700; by 80; by 900.

689, by 20; by 200; by 30; by 300; by 40; by 400; by 50; by 500; by 60; by 600; by 70; by 700; by 80; by 800; by 90; by 900.

Drill as in Exercise CCXXII.

CCCX.

We desire to multiply 416 by 27. $27 = 20 + 7$. The product of 416×7 , added to that of 416×20 , will be the product of 416×27 . We first multiply by the 7 units, and find the product 2,912. We then are to multiply by the 2 tens: to do which we multiply by 2, and remove the product one place to the left. This gives us as the product of 20, or 2 tens, 8,320, which we write beneath the product of 7. The two products being added together, give us a total product of 11,232.

The pupil will explain the following; and read the partial products:

429	429	225	225	1,463
38	294	55	693	427
<hr/> 3,432	<hr/> 1,716	<hr/> 1,125	<hr/> 675	<hr/> 10,241
12,87	38,61	11,25	20,25	29,26
<hr/> 16,302	<hr/> 85,8	<hr/> 12,375	<hr/> 135,	<hr/> 585,2
	126,126		155,925	624,701

Write the following, according to the above form:

Multiply 547 by 29; by 38; by 47; by 56; by 107; by 226; by 395; by 468; by 533; by 675; by 789.

Multiply 2,345 by 21; by 32; by 43; by 54; by 65; by 127; by 238; by 349; by 404.

Multiply 17,642 by 15; by 26; by 37; by 48; by 56.

Drill as in Exercise CCXXII.

CCCXI.

Write the following, as required in Exercise CCXCI.

Divide 1,432 by 13; by 14; by 15; by 16; by 17; by 18; by 19.

Divide 2,768 by 23; by 24; by 25; by 26; by 27; by 28; by 29.

Divide 3,804 by 31; by 32; by 33; by 34; by 35; by 36; by 37; by 38; by 39.

Divide 4,046 by 41; by 42; by 43; by 44; by 45; by 46; by 47; by 48; by 49.

Divide 5,555 by 51; by 52; by 53; by 54; by 55; by 56; by 57; by 58; by 59.

Drill as in Exercise CCXCI.

CCCXII.

Write the following, as required in Exercise CCXCI.

Divide 6,433 by 61; by 62; by 63; by 64; by 65; by 66; by 67; by 68; by 69.

Divide 7,500 by 71; by 72; by 73; by 74; by 75; by 76; by 77; by 78; by 79.

Divide 8,376 by 81; by 82; by 83; by 84; by 85; by 86; by 87; by 88; by 89.

Divide 9,999 by 91; by 92; by 93; by 94; by 95; by 96; by 97; by 98; by 99.

Drill as in Exercise CCXCI.

CCCXIII.

67. $100,000 \div 10 = 10,000$; $10,000 \div 10 = 1,000$; $1,000 \div 10 = 100$; $100 \div 10 = 10$; $10 \div 10 = 1$. To divide any number by 10, remove the figures *one* place to the right.

Thus: $400,000 = 4$ in the 6th place, is to be divided by 10. Remove the 4 to the 5th place, and, filling vacant places with ciphers, we have $40,000 = 400,000 \div 10$. Divide 40,000 or 4 in the 5th place by 10: we put it in the 4th place, and have $4,000 = 40,000 \div 10$. Divide 4,000 by 10, and we have 400. $400 \div 10 = 40$. $40 \div 10 = 4$.

68. $100,000 \div 100 = 1,000$; $10,000 \div 100 = 100$; $1,000 \div 100 = 10$; $100 \div 100 = 1$. To divide any number by 100, remove the figures *two* places to the right.

69. To divide any number by 1,000, remove the figures *three* places to the right.

70. To divide any number by 10,000, remove the figures *four* places to the right.

71. To divide any number by 100,000, remove the figures *five* places to the right.

Removing a number five places to the right, divides it by 100,000; four places, by 10,000; three places, by 1,000; two places, by 100; one place, by 10.

How shall we divide by 10? by 100? by 1,000? by 10,000? by 100,000? by 1,000? by 10? by 10,000? by 100,000? by 100? When we remove a number three places to the right, how have we modified it? one place? four places? two places? five places? three places?

If you divide 6 in the sixth place by 10, where will you put it? if by 1,000? if by 100,000? if by 100? if by 10,000?

If you divide 7 in the fifth place by 10, where will you put it? if by 1,000? if by 100? if by 10,000?

If you divide 8 in the fourth place by 10, where will you put it? if by 1,000? if by 100?

If you divide 9 in the third place by 10, where will you put it? if by 100?

If you divide 5 in the second place by 10, where will you put it?

CCCXIV.

Write the following divisions, the divisor at the left of the dividend, and beneath this, separated by a line, the quotient, units under units, &c.

$4,000 \div 1,000$; $4,000 \div 10$; $400,000 \div 10,000$; $400,000 \div 100,000$; $400 \div 100$; $30 \div 10$; $300 \div 10$; $300 \div 100$; $4,000 \div 100$; $400,000 \div 10$; $400,000 \div 1,000$; $400,000 \div 100$; $240 \div 10$; $2,400 \div 10$; $2,400 \div 100$; $24,000 \div 10$; $24,000 \div 100$; $24,000 \div 1,000$; $125,000 \div 1,000$; $125,000 \div 100$; $125,000 \div 10$; $12,500 \div 100$;

$12,500 \div 10$; $1,250 \div 10$; $520,000 \div 10,000$; $520,000 \div 1,000$; $520,000 \div 100$; $520,000 \div 10$; $52,000 \div 10$; $52,000 \div 100$; $52,000 \div 1,000$; $5,200 \div 10$; $5,200 \div 100$; $520 \div 10$.

Drill as in Exercise CCXCI.

CCCXV.

72. To divide by any number of tens, remove the quotient of that number one place to the right; by any number of hundreds, two places; by any number of thousands, three places, and so on. If any part of the dividend remains undivided, treat it as in former lessons.

Thus: we have 6,480, to be divided by 60. $60 = 6 \times 10$. To divide by 10, we would remove the figures one place to the right. To divide by 60, we so remove them, and divide by 6 at the same time. $60 \overline{) 6,480}$ 6 is contained in the 6 which stands in the fourth place, one time; but as the divisor is 6 tens, we must remove the quotient one place to the right = the third place. So we there write it. The 6 is not contained in the hundreds figure; but this, say 40 tens, is added to the 8 tens, making 48 tens, which contains 6, 8 times. But as this divisor is 6 tens, the 8 must not be written in the second place, but one place to the right = the first place. The second place being vacant, use a cipher.

$$\begin{array}{r} 60 \overline{) 6,480} \\ \underline{108} \end{array}$$

Divide 4,327 by 20. Proceeding as above, the quotient appears to be 216. But the 7 units have not been divided. The true quotient is therefore 216 and 7 divided by 20; $216 \frac{7}{20}$.

Write the following, as in Exercise CCCXIV.

Divide 6,740 by 20; by 30; by 40; by 50; by 60; by 70; by 80; by 90.

Divide 8,346 by 20; by 30; by 40; by 50; by 60; by 70; by 80; by 90.

Divide 87,564 by 200; by 300; by 400; by 500; by 600; by 700; by 800; by 900.

Divide 476,426 by 2,000; by 3,000; by 4,000; by 5,000; by 6,000; by 7,000; by 8,000; by 9,000.

Divide by 20: 4,240; 3,230; 7,649; 8,428.

Divide by 30: 3,330; 4,440; 5,555; 6,789; 4,276.

By 40: 14,004; 23,207; 81,640; 2,768.

By 50: 23,467; 100,206; 4,217; 126,350.

By 60: 1,274; 10,004; 1,001; 25,046.

By 70: 2,460; 35,270; 14,064; 33,460.

By 80: 9,327; 90,320; 467,234.

By 90: 415,260; 37,427; 25,016; 9,270.

Drill as in Exercise CCXCI.

CCCXVI.

Write the following, as required in former lessons:

Divide 23,076 by 123; by 234; by 345; by 456; by 567; by 678; by 789; by 890.

Divide 946,728 by 134; by 245; by 366; by 457; by 578; by 689; by 946.

Divide 999,999 by 27; by 279; by 2,794; by 27,946; by 279,465.

Divide 406,006 by 1,234; by 497; by 684; by 28; by 79; by 405; by 45; by 450; by 4,005.

Divide 214,007 by 34; by 346; by 463; by 639; by 6,039; by 963; by 876; by 4,235; by 532.

Drill as in Exercise CCXCI.

CCCXVII.

Write the greatest number which can be expressed in the sixth place; in the sixth and first; in the sixth and second; in the sixth, second, and first; in the sixth and third; in the sixth, third, and second; in the sixth, third, and first; in the sixth, third, second, and first; in the sixth and fourth; in the sixth, fourth, and third; in the sixth, fourth, third, and second; in the sixth, fourth, third, and first; in the sixth, fourth, third, second, and first; in the sixth, fourth, and

second; in the sixth, fourth, second, and first; in the sixth, fourth, and first; in the sixth and fifth; in the sixth, fifth, and fourth; in the sixth, fifth, fourth, and third; in the sixth, fifth, fourth, and second; in the sixth, fifth, fourth, and first; in the sixth, fifth, fourth, third, and second; in the sixth, fifth, fourth, third, and first; in the sixth, fifth, and third; in the sixth, fifth, third, and second; in the sixth, fifth, third, and first; in the sixth, fifth, third, second, and first; in the sixth, fifth, and second; in the sixth, fifth, second, and first; in the sixth, fifth, and first: in all six places.

Write the greatest number that may be expressed in the first full, or units period; in the second full, or thousands period; in both periods.

DRILL: Read and analyze the numbers written.

CCCXVIII.

73. It will be seen that the thousands period may be numerated just the same as the period of ones, or units.

Thus: 654,321. We numerate the units period thus: (1) units, (2) tens, (3) hundreds. Take the thousands period: (4) units [of thousands,] (5) tens [of thousands,] (6) hundreds [of thousands]. The thousands period may be treated precisely like the units period, and it is governed by the same rules and principles. It must, of course, always be kept in its place.

We read one of the numbers you have been directed to write above (999,999), in the thousands period, the same as in the units period, with the difference of name. We read both 999, calling them in one case *thousand*, and in the other case meaning *units*, or *ones*, though we do not mention them.

Write the numbers required in the foregoing exercise, numerate the periods separately, (units, tens, hundreds — of what?) analyze, and read.

CHAPTER THE THIRTEENTH.

Various Principles.

CCCXIX.

74. When we have written 999,999, we have expressed the highest number we can write in six places, or two periods. $999,999 + 1 = 10$ hundred thousands, or 1,000 thousands. We express this number by writing 1 in the seventh place, thus commencing a new period, which we call *millions*. 1,000,000 is *One million*; 2,000,000 is *Two million*, and so on.

75. In the 8th place, or the tens place of the period, we write *tens of millions*: 10,000,000 is *Ten million*; 20,000,000 is *Twenty million*, and so on.

76. In the 9th place, or the hundreds place of the period, we write *hundreds of millions*: 100,000,000 is *One hundred million*; 200,000,000 is *Two hundred million*.

What is the name of the first period? of the second period? of the third period? What of the first place? of the 4th place? of the 7th place? of the 2d? of the 5th? of the 8th? of the 3d? of the 6th? of the 9th?

In what period will you write figures to make them mean millions? thousands? units?

In what place will you write a figure to make it mean millions? thousands? units? ten-millions? ten-thousands? tens? hundred-millions? hundred-thousands? hundreds?

Write the following numbers in figures: Six million; six million, six hundred thousand; six hundred million, six hundred thousand, six hundred; sixty million, sixty thousand, and sixty; six million, six thousand, and six; six million, sixty thousand, and six; six million and six; six million and sixty; six million, six hundred; six hundred million, six

hundred; six hundred million and sixty; six hundred million and six; six hundred million, six hundred thousand; six hundred million, six thousand; six hundred million, six thousand and six; six hundred and sixty million, six hundred and sixty; six hundred and sixty million, six hundred and sixty thousand, six hundred and sixty; six hundred and sixty-six million, six hundred and sixty-six thousand, six hundred and sixty-six.

Give out similar numbers, with other digits than 6.

Drill as in Exercise CCLXVI.

CCCXX.

Read and analyze the following numbers, first properly inserting the separating comma :

1427	23067	176859
1000001	23674002	123456789
27000040	3006742	600006
5890005	958017	27301604
400000004	217614	99900090
100010001	364010020	127895005
75075075	707070707	50050050

Read also, as in earlier exercises, the value of each figure.

CCCXXI.

Add the following columns, writing the sums below :

147,468,046	132,227,456	109,217,345
218,946,258	123,132,789	178,166,459
27,286,048	13,592,847	34,072,066
197,405,137	224,418,357	226,225,224
227,611,129	118,121,345	17,306,892
19,447,346	143,213,568	210,102,555
<u>102,099,008</u>	<u>227,203,090</u>	<u>147,214,653</u>

246,475,103	103,137,249	122,308,945
23,789,456	128,564,215	207,563,124
34,567,289	215,121,376	168,107,239
89,056,324	126,835,119	127,589,346
414,357,219	145,309,268	209,259,138
<u>117,027,865</u>	<u>203,467,182</u>	<u>119,457,238</u>

Drill as in Exercise CXVI.

CCCXXII.

We have 2,004 for a minuend, 125 for a subtrahend. The units in the latter exceed the units in the former, and there are neither tens nor hundreds in the minuend. We must therefore take one of the thousands = 10 hundreds; 1 of these hundreds = 10 tens; and finally, 1 of these tens = 10 units. We leave still to be diminished 1 thousand, 9 hundreds, 9 tens.

Write the following subtractions, with differences :

457,238,064	300,600,606	452,515,016
<u>264,392,158</u>	<u>157,438,545</u>	<u>264,626,579</u>
947,516,238	800,000,008	517,416,238
<u>653,648,129</u>	<u>100,000,009</u>	<u>193,508,129</u>
123,456,789	317,698,245	542,896,713
<u>98,765,432</u>	<u>143,729,116</u>	<u>116,927,841</u>
990,000,099	567,123,498	378,000,000
<u>123,456,789</u>	<u>378,245,169</u>	<u>147,147,147</u>

Drill as in Exercise XCII.

CCCXXIII.

Write the following multiplications, with products, units under units, &c., and the separating comma properly inserted at the proper time, in partial, as well as in total products :

Multiply 2,467 by 20; by 34; by 456; by 7,809.

30,567 by 70; by 800; by 26; by 149; by 3,542.

127,468 by 60; by 4,000; by 37; by 592; by 5,137.

4,416,746 by 30; by 700; by 45; by 226; by 162.

70,007 by 90; by 500; by 1,600; by 59; by 137; by 2,648; by 14,284.

Drill as in Exercise CCXXII.

CCCXXIV.

Explain the following work, reading and analyzing quotients, products, and differences, as reached:

27)999,999,999(37,037,037 316)846,730,004(2,552,943 $\frac{1}{316}$

81

189,*

189,

99

81

189,

189,

99

81

189

189

672,

174,7

158,0

16,73

15,80

930,

632,

298,0

284,4

13,60

12,64

964

948

16

* This remainder, or new dividend,
is really 189,999,999: why?

Write the following-divisions, in detail, according to the above examples:

Divide 900,000,000 by 25; by 36; by 47; by 58; by 69; by 71; by 84; by 93; by 114; by 225; by 336; by 447; by 558; by 669; by 773; by 882; by 993; by 1,234; by 5,678; by 91,234; by 56,789; by 214,455; by 367,819; by 6,543,117.

Divide 667,425,912 by 16; by 27; by 38; by 49; by 55; by 64; by 73; by 82; by 91; by 667; by 425; by 912; by 1,234; by 5,678; by 1,904; by 23,416; by 15,746; by 416,147.

Drill as in Exercise CCXCI.

CCCXXV.

77. In writing greater numbers than can be expressed by hundred millions, we remove our figures farther still to the left. 1,000 millions = 1 billion. We give this name, *billions*, to the fourth period.

78. * The fifth period is *trillions*. 1 trillion = 1,000 billions = 1,000,000 millions.

What is the name of the first period? the second? the third? the fourth? the fifth? 1 unit of the fifth period = how many of the fourth? of the third? of the second? of the first? 1 unit of the fourth period = how many of the third? of the second? of the first?

Write one million; one billion; one trillion; five million and five; six billion, six million; six trillion, six billion; six trillion, six million; six trillion, six thousand; six trillion and six; nine hundred trillion, nine hundred; forty-six trillion, forty-six billion, forty-six million; forty-six thousand and forty-six; two hundred and forty trillion, two hundred and forty million, two hundred and forty.

Drill as in previous notation exercises.

CCCXXVI.

Read the following numbers, having properly inserted the separating comma :

4567	100306
1001001	500000500
40235	142367050

* For further periods, see Appendix.

3000300003	564000564005
317642	1001001001001
555000555000555	14014014014014
123456789123	999999999999999
110110110110110	11011011011011

Drill as in previous notation exercises.

CCCXXVII.

79. Any number is equal to the sum of all its parts.

If we take these numbers: 2, 3, 5, 7, 8, 4, 6; they may be deemed parts of 35; for $2 + 3 + 5 + 7 + 8 + 4 + 6 = 35$. If we separate these into smaller groups, 2, 3, and 5; 7 and 8; 4 and 6: the sum of these groups will be 35. Thus, $2 + 3 + 5 = 10$; $7 + 8 = 15$; $4 + 6 = 10$; and $10 + 15 + 10 = 35$. By this principle we may test the correctness of our additions; or, as we say, *prove* them.

Add 6, and 4, and 9, and 17, and 28, and 3, and 8, and 15, and 23, and 5, and 12: and prove it by adding the sums of its parts.

6	6	
4	4	
9	9	
17	17	36
28	28	
3	3	
8	8	
15	15	54
23	23	
5	5	
12	12	40
<u>180</u>	<u>180</u>	

The work is correctly done, we may feel confident; for it is hardly possible that the same mistake would be made in doing the work in different ways, though that might be done if the addition were wrought in the same way.

Add as follows, proving by the addition of the sums of parts:

123	1,042	1,046,046	4,217,338	1,743,286
234	4,217	2,378,408	2,559,066	5,912,357
345	7,326	3,592,879	1,824,537	4,689,219
456	5,490	4,415,527	7,942,653	3,546,078
567	8,888	5,624,029	3,635,376	1,868,274
<u>678</u>	<u>2,064</u>	<u>6,417,287</u>	<u>3,563,249</u>	<u>2,059,059</u>

789	9,003	7,298,469	8,673,694	6,714,298
890	5,178	8,117,096	5,896,567	7,236,355
213	7,777	9,999,999	5,243,679	8,417,099
452	1,868	6,426,317	9,425,336	9,876,543
674	2,214	8,173,565	6,357,496	5,555,555
895	1,776	9,009,009	6,736,947	1,357,986
217	4,224	7,416,291	8,188,188	6,666,666
129	3,333	9,533,037	2,894,212	2,468,753
357	5,995	5,550,888	4,182,119	7,777,777
579	8,141	3,033,212	6,666,666	3,215,649
794	9,659	1,234,568	1,234,567	8,888,888
468	5,566	3,578,016	8,922,222	4,577,323
262	6,599	2,040,000	4,017,239	9,999,999
107	4,068	3,674,512	5,055,617	1,376,404

Drill as in Exercise CXVI.

CCCXXVIII.

Add as follows, proving by the addition of the sums of parts:

16 Trillions, 437 Billions, 4 Millions, 46 Thousands, 602, + 47 Trillions, 47 Billions, 47 Millions, 47 Thousands, and 47, + 8 Trillions, 906 Billions, 527 Millions and 46, + 497 Trillions, 123 Billions, 499 Millions, 516 Thousands, 817, + 23 Trillions, 23 Millions, and 23, + 1 Trillion, 1 Billion, 1 Million, 1 Thousand and 1, + 127 Trillion, 563 Billion, 417 Million, 389 Thousands, 159.

237,367,217,896,552	5,176,423,892,377	216,192,467,552
45,073,924,568,443	10,352,847,784,754	432,384,935,104
522,536,962,284,222	3,450,949,261,584	810,794,978,368
67,610,886,852,666	6,901,898,523,169	621,589,956,736

Drill as in Exercise CXVI.

CCCXXIX.

$56 - 39 = 17$. If we add 10 to the minuend, the difference will be greater, by 10: $(56 + 10 =) 66 - 39 = 27 (= 17 + 10)$.

* What is the difference between 9 and 4? What will be the difference if to the minuend I add 3? 6? 7? 9? 15? 36? 10?

What is the difference between 56 and 39? What if to the minuend I add 4? 7? 6? 9? 3? 2?

$56 - 39 = 17$. If we add 10 to the subtrahend, the difference will be less, by 10: $56 - (39 + 10 =) 49 = 7 (= 17 - 10)$.

What is the difference between 100 and 4? What if to the subtrahend I add 3? 7? 9? 10? 20? 30? 40? 50? 60? 70? 80? 90? What if to the minuend I add 1? 3? 5? 7? 2? 4? 6? 8?

$56 - 39 = 17$. If we add 10 to both subtrahend and minuend, the difference will remain 17. By adding 10 to the minuend, we make the difference 10 greater: but by adding 10 to the subtrahend, we bring it back to its former amount. $(56 + 10 =) 66 - (39 + 10 =) 49 = 17 (= 17 + 10 - 10)$.

What is the difference between 25 and 9? What if both to the minuend and the subtrahend I add 7? 5? 10? 90? 16? 57? 48? 32? 172?

CCCXXX.

80. If we increase a Minuend, we increase the difference; if we increase a Subtrahend, we decrease the difference; if we increase both Minuend and Subtrahend alike, we do not affect the difference.

By this principle we may use a second mode of subtraction, when a figure in the Subtrahend is greater than the corresponding figure in the Minuend.

Subtract 4,237 from 10,000. The units figure cannot be subtracted. Therefore add 1 ten = 10 units to the Minuend. $10 - 7 = 3$. Inasmuch as

* Let the questions of this exercise be answered orally both by adding to the Minuend or Subtrahend, as the case may be; and thus finding the new difference, or by adding to or subtracting from the difference, according to the principle illustrated.

1 ten has been added to the Minuend, it must now be added to the Subtrahend, so that the Difference may not be affected. We therefore add 1 ten to the 3 tens = 4 tens. The tens figure cannot be subtracted. Therefore add 1 hundred = 10 tens to the Minuend. $10 - 4 = 6$. As 1 hundred has been added to the Minuend, it must be added to the Subtrahend, lest the Difference be made too great. 2 hundreds + 1 hundred = 3 hundreds. The hundreds figure cannot be subtracted. Therefore add to the Minuend 1 thousand = 10 hundreds. $10 \text{ hundreds} - 3 \text{ hundreds} = 7 \text{ hundreds}$. As we have added 1 thousand to the Minuend, we must add the same quantity to the Subtrahend, or our Difference will be 1,000 too great. 4 thousand + 1 thousand = 5 thousand. $10 \text{ thousand} - 5 \text{ thousand} = 5 \text{ thousand}$. The Difference between 10,000 and 4,237 is 5,763.

10,000	
4,237	5,763

units, 6 tens, 7 hundreds, 5 thousands = 5,763.

Subtract as follows, using the above principle and method, where applicable :

From 5,427 take 2,115; take 3,318; take 1,539; take 956; take 1,500; take 2,555; take 999; take 255; take 1,778; take 2,444; take 3,666; take 4,777; take 1,868; take 2,909.

From 1,000 take 123; take 234; take 345; take 456; take 567; take 678; take 789.

From 1,000,000 take 1; take 22; take 333; take 4,444; take 55,555; take 666,666; take 7; take 18; take 932; take 1,478; take 23,675; take 415,789.

Drill as in Exercise XCIV.

CCCXXXI.

81. The greater of two numbers — their difference = the less; and the less of two numbers + their difference = the greater.

If we take two numbers, 25 and 13, we find their difference 12. 25 (the greater) — 12 (the difference) = 13 (the less); and 13 (the less) + 12 (the difference) = 25 (the greater). By these two principles we may test the correctness of our subtractions, or prove them.

Find the difference between 9,046 and 6,972, and prove by addition and subtraction.

$$\begin{array}{r} 9,046 \text{ M.} \\ 6,972 \text{ S.} \\ \hline 2,074 \text{ D.} \end{array}$$

$$\begin{array}{r} 9,046 \text{ M.} \\ 2,074 \text{ D.} \\ \hline 6,972 \text{ S.} \end{array}$$

$$\begin{array}{r} 6,972 \text{ S.} \\ 2,074 \text{ D.} \\ \hline 9,046 \text{ M.} \end{array}$$

Subtract as follows, by the method of the preceding exercise, and prove both by subtraction and addition :

10,740	417,243	1,234,567	467,204,050
<u>5,375</u>	<u>99,999</u>	<u>475,275</u>	<u>235,333,333</u>
5,427,360,116	3,474,516,366	9,674,573,236	
<u>2,713,680,058</u>	<u>1,158,172,122</u>	<u>2,418,643,309</u>	
8,452,764,255	276,328,427,604	526,417,893,127	
<u>1,690,552,851</u>	<u>46,054,737,934</u>	<u>75,202,556,161</u>	
600,000,000,000	444,444,444	1,000,000,000,000	
<u>5,000,005,006</u>	<u>1,567,898</u>	<u>68,000,008,008</u>	

Drill as in Exercise XCIV.

CCCXXXII.

82. If a Product is divided by the Multiplier, the Quotient will be the Multiplicand ; or, if it is divided by the Multiplicand, the Quotient will be the Multiplier.

Thus: 25 (Multiplicand) \times 5 (Multiplier) = 125 (Product). 125 (P.) \div 5 (Mr.) = 25 (Md.): and, 125 (P.) \div 25 (Md.) = 5 (Mr.). Multiplication may thus be proved by Division.

Multiply 4,507 by 23, and prove by division, both ways.

4,507	23) 103,661(4,507	4,507) 103,661(23
<u>23</u>	<u>92,</u>	<u>90,14</u>
18,521	<u>11,6</u>	<u>13,521</u>
<u>90,14</u>	<u>11,5</u>	<u>13,521</u>
103,661	<u>161</u>	
	<u>161</u>	

Multiply as follows, and prove by division, both ways :

Multiply 5,674 by 15 ; by 23 ; by 46 ; by 78 ; by 92 ; by 147 ; by 236 ; by 455 ; by 617 ; by 427 ; by 823 ; by 1,234 ; by 3,342 ; by 1,500 ; by 5,674.

Multiply 2,317,046 by 4; by 5; by 6; by 7; by 8; by 9; by 15; by 23; by 49; by 67; by 58; by 153; by 247; by 639; by 345; by 498; by 672; by 525; by 726.

Multiply 346 million by 2; by 3; by 4; by 5; by 6; by 7; by 8; by 9; by 12; by 23; by 34; by 45; by 56; by 67; by 78; by 89; by 123; by 245; by 367; by 489.

Drill as in Exercise CCXXII and CCXCI.

CCCXXXIII.

83. Divisions may be tested or proved by Multiplication. The Dividend answers to the Product, which the Divisor and Quotient will produce by Multiplication.

Thus: $25 \div 5 = 5$, because $5 \times 5 = 25$. If I wish to test the correctness of my divisions, I will see if my divisor \times my quotient = my dividend. 31,104 is to be divided by 216.

$$\begin{array}{r} 216) 31,104(144 \\ \underline{21,6} \\ 9,50 \\ \underline{8,64} \\ 864 \\ \underline{864} \end{array}$$

$$\begin{array}{r} \text{PROOF: } 216 \text{ Dr.} \\ \underline{144 \text{ Q.}} \\ 864 \\ 8,64 \\ \underline{21,6} \\ 31,104 \text{ Dd.} \end{array}$$

Undivided numbers remaining, are to be added to the product of the Quotient and Divisor. 2,167 is to be divided by 24.

$$\begin{array}{r} 24) 2167(90\frac{7}{24} \\ \underline{216} \\ 7 \end{array}$$

$$\begin{array}{r} \text{PROOF: } 90\frac{7}{24} \\ \underline{24} \\ 367 \\ \underline{1,8} \\ 2,167 \end{array}$$

$90 \times 24 = 2,160$, and 7 undivided units added, make 2,167.

Again: 2,167 is to be divided by 168.

$$\begin{array}{r} 168) 2,167(12\frac{151}{168} \\ \underline{1,68} \\ 487 \\ \underline{336} \\ 151 \end{array}$$

$$\begin{array}{r} \text{PROOF: } 168 \\ \underline{12\frac{151}{168}} \\ 2,016 \\ \underline{151 \text{ undivided.}} \\ 2,167 \end{array}$$

Divide as follows, and test the work by multiplication :

Divide 123,456,789 by 17 ; by 22 ; by 27 ; by 32 ; by 37 ; by 42 ; by 47 ; by 52 ; by 57 ; by 63 ; by 73 ; by 84 ; by 87 ; by 96 ; by 97 ; by 123 ; by 144 ; by 153 ; by 167 ; by 175 ; by 189 ; by 193 ; by 255 ; by 317 ; by 444 ; by 567 ; by 652 ; by 778 ; by 875 ; by 999.

Drill as in Exercise CCXCI.

CCCXXXIV.

84. When the figures of a multiplier are all nines, we may shorten our work.

Thus: $99 = 100 - 1$. The product of 100, less the multiplicand taken once, will be the product of 99.

$$(576 \times 100) - (576 \times 1) = (576 \times 99)$$

$$576 \times 100 = 57,600$$

$$576 \times 1 = 576$$

$$576 \times 99 = 57,024$$

Again: $999 = 1,000 - 1$. The product of 1,000 less the multiplicand taken once, will be the product of 999.

$$576 \times 1,000 = 576,000$$

$$576 \times 1 = 576$$

$$576 \times 999 = 575,424$$

On the same principle, multiply by 9,999, 99,999, and so on.

Multiply the following by 99, as above, and prove, by Division :

236 ; 354 ; 789 ; 1,244 ; 2,486 ; 2,315 ; 3,488.

Multiply the following by 999, and prove as before :

4,217 ; 5,638 ; 6,459 ; 7,325 ; 8,415 ; 9,009 ; 3,333.

Multiply by 9,999, and prove :

1,234 ; 2,567 ; 3,809 ; 4,321 ; 10,564 ; 23,207 ; 38,946.

Multiply and prove :

146,798 by 99 ; by 999 ; by 9,999 ; by 99,999 ; by 999,999.

Drill as in Exercise CCXXII.

CCCXXXV:

POPULATION OF THE UNITED STATES AT SEVERAL PERIODS.

	1790.	1820.	1840.	1860.
<i>North-Eastern.</i>				
Maine	96,540	298,269	501,793	628,279
New Hampshire	141,899	244,171	284,574	326,073
Vermont	85,416	235,999	291,948	315,098
Massachusetts	378,717	523,290	737,699	1,231,066
Rhode Island	69,110	83,015	108,830	174,620
Connecticut	238,141	275,102	309,978	460,147

<i>Eastern.</i>				
New York	340,120	1,372,111	2,428,921	3,880,735
New Jersey	184,139	278,127	373,306	672,035
Pennsylvania	434,373	1,047,551	1,724,033	2,906,115
Delaware	59,096	72,749	78,085	112,216
Maryland	319,728	407,478	470,019	687,049

<i>South-Eastern.</i>				
West Virginia	[with Va.]			
Virginia	748,308	1,065,129	1,239,797	1,596,318
North Carolina	393,751	638,968	753,419	992,622
South Carolina	249,073	502,793	594,398	703,708
Georgia	82,548	341,032	691,392	1,057,286
Florida	.....	.....	54,477	140,425

<i>Southern.</i>				
Alabama	.....	127,919	590,756	964,201
Mississippi	.....	75,487	375,651	791,305
Louisiana	.....	152,989	352,411	708,002
Texas	.....	.....	.....	604,215

<i>Central.</i>				
Kentucky	78,077	564,619	779,828	1,155,684
Tennessee	35,791	422,761	829,210	1,109,801

	1790.	1820.	1840.	1860.
Arkansas	14,255	97,574	435,450
Missouri	66,696	383,702	1,182,012
Kansas	107,206
<i>North Central.</i>				
Ohio	581,295	1,519,467	2,339,511
Michigan	8,765	212,267	749,113
Indiana	147,178	685,866	1,350,428
Illinois	55,162	476,183	1,711,951
Iowa	43,112	674,943
Nebraska	28,841
Minnesota	172,123
Wisconsin	37,045	775,881
<i>Pacific.</i>				
California	379,994
Nevada	17,364
Oregon	52,465
<i>Territories.</i>				
Indian
New Mexico	83,009
Arizona
Utah	40,699
Colorado	36,538
Wyoming
Idaho
Washington	11,168
Dakotah	2,576
District of Columbia.	33,039	43,712	75,080

What was the population of the United States in 1790? In 1820? In 1840? In 1860? How much more in 1820 than in 1790? In 1840 than in 1820? In 1840 than in 1790? In 1860 than in 1840? In 1860 than in 1820? In 1860 than in 1790? Which State contained the greatest

number of people in 1790? How many more than in New York? than in Massachusetts? Which State was the most populous in 1820? How many more people in that State then than in Virginia? than in Massachusetts? Which was the most populous State in 1840? In 1860? What was the increase of the population of this State at each period given above?

Many questions in addition and subtraction may be framed by the teacher upon the above table, if deemed advisable.

CCCXXXVI.

In what year were you born? How old are you? Add your age to the number of the year of your birth: does that give the number of the present year? Subtract your age from the number of this year: does that give the year in which you were born?

In what year did the following persons, who had been presidents of the United States, die?

George Washington, born in 1732, age at death,	67
John Adams,	1735, 91
Thomas Jefferson,	1743, 83
James Madison,	1751, 85
James Monroe,	1758, 73
John Quincy Adams,	1767, 81
Andrew Jackson,	1767, 78
Martin Van Buren,	1782, 80
William H. Harrison,	1773, 68
John Tyler,	1790, 72
James K. Polk,	1795, 54
Zachary Taylor,	1784, 66
Franklin Pierce,	1804, 65
James Buchanan,	1791, 77
Abraham Lincoln,	1809, 56

CCCXXXVII.

How old were the presidents of the United States named in the foregoing exercise, at the times when they severally became presidents, as here specified?

Washington,	1789	John Adams,	1797
Jefferson,	1801	Madison,	1809
Monroe,	1817	John Q. Adams,	1825
Jackson,	1829	Van Buren,	1837
Harrison,	1841	Tyler,	1841
Polk,	1845	Taylor,	1849
Pierce,	1853	Buchanan,	1857
Lincoln,	1861		

How old were the following when they became presidents?

Millard Fillmore,	born in 1800,	president in 1850.
Andrew Johnson,	1808,	1865.
Ulysses S. Grant,	1822,	1869.

How old were the following persons when they died?

Christopher Columbus,	born in 1435,	died in 1506.
Marquis de la Fayette,	1757,	1834.
Benjamin Franklin,	1706,	1790.
John Winthrop,	1588,	1649.
Henry Clay,	1777,	1852.
Daniel Webster,	1782,	1852.
Stephen A. Douglas,	1813,	1861.
Thomas H. Benton,	1782,	1858.
Edward Everett,	1794,	1865.
Winfield Scott,	1786,	1866.
Joseph Warren,	1741,	1775.
Alexander Hamilton	1757,	1804.
Samuel Adams,	1722,	1803.
Israel Putnam,	1718,	1790.

CCCXXXVIII.

A corn factor purchased of one farmer 517 bushels of grain; of another, 643 bushels; of another, 429 bushels; of another, 162 bushels; of another, 297 bushels. How many bushels did he buy altogether? What was the freight, in cents, at 3 cents a bushel? How many dollars will that make, 100 cents = 1 dollar? How many cents did he pay for the grain, at 110 cents a bushel? How many dollars? For what did he sell the grain, at 123 cents a bushel, in cents and dollars? What was the profit in cents and dollars?

A man travels 1,584 miles in 3 days: how many miles does he travel in a day? In an hour, 24 hours = 1 day? How far has he still to travel after the first day? After the second day?

Bought 726 acres of land, at 42 dollars per acre: what was the cost? 614 acres? 1,472 acres? There are 4,840 square yards in an acre: how many square yards in each of the above farms?

How many days are there in 1869 years, each of 365 days, adding to the product 453 days, for the extra days of leap years?

CCCXXXIX.

What number must be taken from 5,768, in order that the remainder shall be 4,444?

If a subtrahend is 2,314, and the remainder, 7,869, what is the minuend?

The product of two numbers is 74,646, and one of the numbers is 234: what is the other?

What number must be divided by 432, in order that the quotient shall be 2,027?

Divide 27,537 dollars equally among 201 men. Among 67 men.

A herdsman bought 468 head of cattle at 148 dollars per head. At what price per head must he sell them, in order to gain 6,552 dollars on the whole?

12 things make a dozen: what is the difference between six dozen dozen and a half-dozen dozen, their product, and the quotient of the greater by the less?

If a piece of goods, measuring 69 yards, cost 9,315 cents: how much is that a yard?

Paid 5,247 cents for a firkin of butter, weighing 99 pounds: how much is that a pound?

In how many hours will a cistern holding 7,992 gallons be filled, at the rate of 37 gallons per hour?

A certain part of a canal can be dug by 288 men in 56 days: how long would it take 1,152 men to do the same work?

APPENDIX.

I.

85. It is very seldom that we have to deal with numbers greater than *trillions*. These represent quantities of which we cannot conceive. And yet we may work with them, and even greater numbers, with as much ease as with hundreds. Addition, subtraction, multiplication, and division of trillions, and of far larger quantities, are done on the same principles as those of hundreds.

But before giving the names of more advanced periods, let us see if we can get an idea of the increase of numbers by change of place. 1 may be expressed in a moment of time; 10 in a few seconds; 100 in about a minute and a half, counting 1 each second [the teacher may show this]. To count 1,000 would require about as long as a morning recess (something more than 16 minutes); to count 10,000, something less than 8 hours; to count 100,000, nearly 5 school-days; 1,000,000 nearly 46 school-days; 1,000,000,000, more than 31 years, if we did not stop to eat or to sleep; 1,000,000,000,000, more than 31,000 years! And yet we can calculate these immense numbers just as readily as tens, hundreds, and thousands!

86. Names have been given to 22 periods, or 17 periods beyond trillions. We insert them here for reference:

1st period, Units	5th period, Trillions
2d, Thousands	6th, Quadrillions
3d, Millions	7th, Quintillions
4th, Billions	8th, Sextillions

II.

87. The notation taught in this work is that now in general use in the United States and on the continent of Europe. But the English have another system, which, however, will probably give way to that elsewhere adopted. It is well, perhaps, to compare the two systems.

88. The English divide the numeral places into periods of *six* instead of *three*. One million would be thus divided: 1,000000. Up to hundreds of millions numbers would be read the same; thus: 467,467467, is 467 million, 467467. But while we call a thousand million a billion, the English call a million million a billion. What we call a trillion, they call a billion. Their periods run thus:

Quintillions	Quadrillions	Trillions	Billions	Millions	Units .
654321	654321	654321	654321	654321	654321

They would read this number 654321 Quintillion, 654321 Quadrillion, 654321 Trillion, 654321 Billion, 654321 Million, 654321. It is only a different mode of reading: the places retain their values.

89. To change from the English method to the usual one (which is known as the French) is very easy. Write the number six places to the period, remembering that the English have no thousands *period*, though the fourth *place* in each period is thousands. Then divide into periods of three places, numerate and read.

Change the following English expression into the usual form: 207468 billion, 15 million, 4026.

207468,000015,004026:

Dividing this into periods of three places, we have

207,468,000,015,004,026;

Or, 207 Quadrillion, 468 Trillion, 15 Million, 4 Thousand, and 26.

90. To convert the usual method into the English form is just as easy. Write the number as usual, divide into periods of six places, numerate and read.

Change the following expression into the English form: 6 Quintillion, 27 Quadrillion, 146 Trillion, 16 Billion, 407 Million, 2 Thousand and 40.

6,027,146,016,407,002,040.

Dividing this into periods of six places, we have

6,027146,016407,002040;

Or, 6 Trillion, 27146 Billion, 16407 Million, 2040. The number is the same. It is only read differently.

91. For caution, we repeat that a billion, of the usual or French numeration, is a *thousand* million; a billion, of the English numeration, is a *million* million.

92. The usual or French method is the more convenient, and it is getting into use in England.

C O U R S E S.

SHOULD any prefer the older divisions of arithmetical study, or only one or more of the processes be needful for special study, another order may be found, as below:

OBJECT-LESSONS.

One to Nine, pp. 1 to 27; Ten to Nineteen, pp. 44 to 48.

NOTATION.

One to Nine, Exercises 1 to 3; Ten to Nineteen, Ex. 36 to 38; Twenty to Twenty-nine, Ex. 74 to 76; Thirty to Thirty-nine, Ex. 107 to 109; Forty to Forty-nine, Ex. 136 to 138; Fifty to Fifty-nine, Ex. 163 to 165; Sixty to Sixty-nine, Ex. 187 to 189; Seventy to Seventy-nine, Ex. 207 to 209; Eighty to Eighty-nine, Ex. 227 to 229; Ninety to Ninety-nine, Ex. 247 to 249; Three Places, Ex. 265 to 269; Two Periods, Ex. 292 to 300; 317, 318; Three Periods, Ex. 319, 320; Five Periods, Ex. 325, 326; Twenty-two Periods, Appendix, I.; English Method, Appendix II.

ADDITION.

One to Nine, Exercises 4 to 17; Ten to Nineteen, Ex. 39 to 52; Twenty to Twenty-nine, Ex. 77 to 85; Thirty to Thirty-nine, Ex. 110 to 117; Forty to Forty-nine, Ex. 139 to 146; Fifty to Fifty-nine, Ex. 166 to 172; Sixty to Sixty-nine, Ex. 190 to 196; Seventy to Seventy-nine, Ex. 210 to 216; Eighty to Eighty-nine, Ex. 230 to 236; Ninety to Ninety-nine, Ex. 250 to 256; Three Places, Ex. 270 to 276; Two or More Periods, Ex. 301; 320, 321; 327, 328; 335.

SUBTRACTION.

One to Nine, Exercises 18 to 26; Ten to Nineteen, Ex. 53 to 65; Twenty to Twenty-nine, Ex. 86 to 99; Thirty to Thirty-nine, Ex. 118 to 128; Forty to Forty-nine, Ex. 147 to 155; Fifty to Fifty-nine, Ex. 173 to 177; Sixty to

Sixty-nine, Ex. 197 to 199; Seventy to Seventy-nine, Ex. 217, 218; Eighty to Eighty-nine, Ex. 237, 238; Ninety to Ninety-nine, Ex. 257, 258; Three Places, Ex. 277, 278; Two or More Periods, Ex. 302; 322; 329 to 331; 336 to 339.

MULTIPLICATION.

One to Nine, Exercises 27, 28; Ten to Nineteen, Ex. 66, 67; Twenty to Twenty-nine, Ex. 100 to 102; Thirty to Thirty-nine, Ex. 129 to 131; Forty to Forty-nine, Ex. 156 to 158; Fifty to Fifty-nine, Ex. 178 to 181; Sixty to Sixty-nine, Ex. 200 to 202; Seventy to Seventy-nine, Ex. 219 to 222; Eighty to Eighty-nine, Ex. 239 to 242; Ninety to Ninety-nine, Ex. 259 to 261; Three Places, Ex. 279 to 282; Two or More Periods, Ex. 303 to 310; 323; 332; 334; 338, 339.

DIVISION.

One to Nine, Exercises 29 to 34; Ten to Nineteen, Ex. 68 to 73; Twenty to Twenty-nine, Ex. 103 to 106; Thirty to Thirty-nine, Ex. 132 to 135; Forty to Forty-nine, Ex. 159 to 162; Fifty to Fifty-nine, Ex. 182 to 186; Sixty to Sixty-nine, Ex. 203 to 206; Seventy to Seventy-nine, Ex. 223 to 226; Eighty to Eighty-nine, Ex. 243 to 246; Ninety to Ninety-nine, Ex. 262 to 264; Three Places, Ex. 283 to 291; Two or More Periods, Ex. 311 to 316; 324; 333; 338, 339.

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